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Modified Black Hole with Polar Jet and Vortex

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Herein we shall not assume the conventional Newtonian or GRT (General Relativity Theory) local conceptualization of possible infinite negative PE_L, (local potential energy) in principle; wherein the latter is associated with the lack of a gravitational equilibrium state. Actually in a C_R (pseudo-Riemannian continuum) description, only for greater than the Planck scale, would there be local scale (just a finite finer) description. We shall herein consider absolute PE_L as having a very great value, but yet always finite, in a p_R scale description. For example, for a local black hole description in GRT, we shall not assume a mathematical extrapolation of the field equations to an infinitely negative PE_L description. Rather locally, we shall consider that there is always a p_R (real particle) scale description, even at the CE of BH_m (center of energy of modified black hole); this would seem in step with the speculative consideration of always allegedly a p_R description for all stages of precursor regional volume -> regional volume, V_{Rp}->V_R->V_{Rp}. Of course, locally there is conventionally, and in fact, a $\{p_v\}$ (set of virtual particles) description, in association with a p_R description, as part of quantum field descriptions, and as part of the local physical vacuum. So in a modified local description, for a BH_m (a modified local BH_m description), one might seemingly consider that there is always a $\{p_R\}$ scale, even for at the center of energy (i.e. CE of BH_m), and for a geometric center, for the BH_m. So a mathematical extrapolation to a so-called singularity description (i.e. as if infinite curvature and infinite energy, even though GRT has only a finite finer scale description), is not included in the herein BH_m conceptualization. In a more detailed idealized description of a modified local black hole, for a so-called polar vortex, one might consider an inwardly spiraling (not necessarily log spiraling) of large scale idealized bulk motion of

concomitant 3-volumes, each consisting of $\{p_R\}$. For example, for interacting real photons, $\{photon_R\}$, and plasma and associated magnetic field, one considers such as part of concomitant idealized bulk 3-volume motion inwardly and downwardly spiraling about rotation axis, a_R, down towards the CE of BH_m, and concomitantly so for other 3-volumes, and also subsequently, for given 3-volumes, outward and up (and then subsequently downward) spiraling of $\{p_R\}$ in the same sense of rotation for the respective upper and lower hemisphere idealized bulk modified circulation (i.e. off internal accretion disk re-distribution), respectively. Then such idealized large bulk 3-volume(s) motion could be considered to transport interacting $\{p_R\}$ inward and downwards towards the CE of BH_m, but wherein such general modified circulation description for the concomitant bulk 3-volume motion of interacting $\{p_R\}$ would be for just a finite finer p_R scale.

There would still be copious p_R interactions within such 3-volume(s), and between adjacent idealized 3-volumes on a more local finer scale. Of course, realistically, there is no clear cut demarcation of a boundary of such an idealized 3-volume. Rather there is just locally p_Rs interactions everywhere. In such a modified BH_m description, the modified BH_h (i.e. modified black hole horizon) could be considered as comprised of $\{p_R\}$, and in particular, in an idealized simplification, inclusive of just $\{photons_R\}$. Just transiently would such concomitant bulk 3-volumes (and contained $\{photon_R\}$) be at an outer-most part of an alleged ongoing overall spiraling (not necessarily a local log spiraling) path for an idealized 3-volume of $\{p_R\}$, as for example, for $\{photon_R\}$. Hence herein one would not have a scenario of $\{photon_R\}$ 'hovering' at the modified BH horizon (BH_h,) nor just the same $photon_R$ remaining in motion, but at a fixed radius; hence no static depiction of BH_h with $\{photon_R\}$ 'hovering' or traversing on just a 2-surface BH_h construct. As a practical aside, an accretion model of the radio source Sgr A*, a possible massive BH at the center of our

galaxy, has been proposed, wherein most of the energy, gas etc. is carried across the BH_h, rather than appearing as observable radiation, as for example, in a thin accretion disk model.[430,431] So such a schematic internal (i.e. BH_h) modified global circulation of bulk 3-volumes of $\{p_R\}$ would seem consistent with an alleged just finite finer p_R scale description for $\{p_R\}$. Hence the above modified local description would seem consistent with just a finite local negative PE_L. Such a briefly sketched speculative scenario of a larger scale local bulk motion of $\{p_R\}$, concomitant to finer scale local ongoing interactions of $\{p_R\}$ in 3-volumes, and between adjacent 3-volumes, for BH_h of BH_m, would seemingly give an idealized description of a modified flow description of an alleged large scale bulk 3-volume(s) of $\{p_R\}$, concomitant to local p_Rs interactions. Perhaps just a modified streamline description, wherein such lines are tangent to the fluid velocity of modified flow (Vf_m) at each location,[11] might best describe the modified velocity modified field (i.e. a set of $\{Vf_m\}$, as depicted schematically in appendix figure 1. Perhaps even a modified steady flow analogy might be appropriate. That is, for any one mathematical fixed position, different 3-volumes passing along a spiral path, would take on the same value of Vf_m (and orientation) at that mathematical fixed position.[11] In other words, the modified streamline pattern would remain invariant. Contrarily, if unsteady flow, then the streamline pattern would change in time. How realistic might such an idealized scenario be? Probably not very realistic, except perhaps in a very general overall bulk 3-volume motion sense. This will be elaborated about shortly. However, if such bulk 3-volume spiral motion had some descriptiveness for large scale motion for modified BH_h, how could one find any supportive evidence for such a conceptualization? Might a theoretical analysis and computer simulations of a bulk motion in the modified ergosphere of a rotating BH_m might be suggestive of a somewhat similar pattern also for less than and equal to BH_h of a modified BH? Also many conventional rotating BHs, if not all, for the

evolution of our V_R ('universe'), are commonly considered as having an (external) accretion disk, with inward spiraling (not necessarily log spiraling) of $\{p_R\}$, near an equatorial plane. Such $\{p_R\}$ are driven into an equatorial plane as described by Bardeen-Peterson effect and by viscous forces.[49]

Some such $\{p_R\}$ of such external accretion disk probably become redistributed off the equatorial plane, as for example, in a magnetosphere description of a rotating magnetized BH[49,467]. Such a magnetic field and electric field description (i.e. magnetosphere) of a rotating BH, with $\{p_R\}$ redistribution off the equatorial plane, would be consistent with there being <u>not</u> just an idealized uninterrupted inward spiraling (not necessarily log spiraling) of $\{p_R\}$ just in an equatorial plane accretion disk inward towards BH. Also there may be no reason why an analogous <u>internal</u> magnetosphere-like description might not also be partially or totally descriptive for $<BH_h$, since the BH_h is not a physical barrier to inward spiraling $\{p_R\}$ nor for any associated magnetic field (lines). Also rotation of a BH_m does not necessarily have to be conceptualized as rotation of the modified BH_h construct only. Rather rotation very likely would seem characteristic for all radii for modified Bh_h. For less than and equal to BH_h, such magnetic field lines, and electric fields and currents, would be confined to $<BH_h$ (however <u>not</u> so for alleged polar vortex, wherein such BH_h is allegedly no longer descriptive). But still allegedly one could have an off-equatorial redistribution of $\{p_R\}$ (carrying off angular momentum) for $<BH_h$. For example, one could have some sort of magnetic field lines spiraling upward off the equatorial plane region, and then perhaps eventually inward spiraling of such magnetic field lines, about rotation axis of BH_m, similar in pattern to figure 1 of appendix, and likewise so for greater than $>BH_h$ for near polar vortex. Also then there are probably associated charged particles of $\{p_R\}$, and thus electric fields (lines) in currents for $<BH_h$, and hence magnetohydrodynamics of plasma. Hence by examination of the conceptualization of a $>BH_h$

external magnetosphere, one could perhaps analogously utilize in part some general concepts and patterns, and perhaps supply some such concepts to a model for less than modified BH_h. Also such external magnetosphere is characterized by much $\{p_R\}$ local interactions and dissipation.[49] Hence this would seem to be consistent with not just an idealized streamline bulk scale 3-volume spiral path (not necessarily log spiral) for less than and equal to BH_h. However, for external magnetosphere, the overall general patterns of electric current flow of $\{p_R\}$ and magnetic fields, wouldn't necessarily exclude concomitant copious $\{p_R\}$ interactions and dissipation. Also the conceptualization of an ergosphere for external to BH_h, wherein for less than stationary limit, the rotational component of motion (i.e. dragging of local inertial frame) cannot be avoided, would seem to contribute to (what is herein referred to as a polar vortex) description, for the ergosphere for a rotating Kerr model[51] BH. An absence of ergosphere at the rotation axis per se, would seem consistent with no rotational component (i.e. no dragging of local frame of reference) for $\{p_R\}$, if such p_R were transiently on the rotational axis. Also, a non-rotating BH would have no ergosphere i.e. no dragging of local frame of reference.[3] Such dragging of local inertial frames (i.e. of C_R) in the same sense as for a rotating BH, would seem consistent with also an external and internal accretion disk, as well as an alleged off disk re-distribution (for less than and equal to BH_h) for both hemispheres, and for 2 alleged polar vortices, all having the same sense of rotation.Could $\{p_R\}$ for a rotating BH, for $<BH_h$, be located at the axis of rotation, even transiently, and thus transiently not have a rotational component of motion?

Conventionally, if one mathematically follows such axis of rotation, it would intersect supposedly with a singularity construct, allegedly at mathematical center of a somewhat oblate rotating BH. However, in a BH_m version, one might draw an analogy in regards to an overall idealized bulk motion of $\{p_R\}$, there is just inward and downward spiraling (not necessarily log spiraling) motion around a_R of BH_m

down towards near CE of BH_m, and then outward and upward spiraling of idealized 3-volumes in northern hemisphere (and as roughly schematically depicted for the southern hemisphere) as per figure 1 appendix. This is all on a finite p_R scale description. As mentioned, in the BH_m scenario, there is considered to be always a p_R scale description everywhere for less than modified BH_h, and even at CE of BH_m. Hence no just Sg scale, even for $<BH_h$, would be consistent with an alleged invariant modified topology pattern for throughout V_R, with no modified discontinuity, for all stages of ... V_{Rp}->V_R->V_{Rp} .. . Also one has an alleged idealized bulk motion 3-volume description of inward spiraling about a_R towards CE of BH_m, there would be increasing velocity, Vf_m, of such 3-volume mod flow. Might not then one eventually have a case of possible local closed time-like curves, perhaps analogous to those described in a Kerr solution of a rotating BH?[245] However, in computer simulations, spinning BHs might shed mass sufficiently fast so as to reduce the rotation of BH below a critical value.[245] Also might rotational energy, and angular momemtum, and increased magnetic field energy, in part allegedly be re-distributed into outward propagating (outward spiraling?) matter (inclusive of plasma and associated magnetic field), about a_R - giving rise to a so-called polar jet? Neutrinos and g.w.s might also carry off angular momemtum, thus outwardly spiraling about a_R in alleged polar vortex of BH_m, although not confined by magnetic field lines. What would be the waveform[481] of such predicted g.w.s propagating from deep within an alleged polar vortex of such BH_m? Also as mentioned, in herein model, one allegedly has an overall outward and upward spiraling of the mod global circulation for $<Bh_h$. So the scenario of inward spiraling bulk 3-volume motion (for internal accretion disk, as well as for off disk re-distribution) about a_R, towards the modified CE of BH_m, might both shed sufficient local mass and energy (vis a vis polar beam-jet?), so as to reduce the spin (i.e. rotation) below a critical value, so as to not have a local closed time-like curve. Also for the BH_m

speculative scenario described herein, with respective polar vortices of idealized 3-volumes inwardly and downwardly spiraling towards near CE of BH_m, only a finite bulk 3-volume velocity, and still always finite KE_L of such idealized bulk 3-volume motion, is alleged. So no singularity (Sg) description (i.e. no -> infinite energy, nor -> infinite local 4-curvature) is meant to be implied. In such BH_m scenario, the realization of closed local time-like curves, and of a Sg, is allegedly avoided. Such avoidance of a local closed time-like curve, would be consistent with the modified time constructs (MTCs), which are allegedly monotonically incessantly inexorably ever additive in successive increments. That is, such MTCs, S_{Tm}, phi_m, $deltaV^3{}_L$ member of $deltaV_R$, $deltas_L$, $deltaI_L$, allegedly have a common abstract modified 1-manifold description ($M^1{}_m$) vis a vis modified homeomorphism. Hence one has $M^3{}_R$ x $M^1{}_m$, and concomitantly $M^3{}_L$ x $M^1{}_m$ evolution, wherein $\{M^3{}_L\}=M^3{}_R$ i.e. $M^3{}_L$ is considered as a local portion of overall regional $M^3{}_R$, but wherein $M^3{}_L$s of one V_R are considered to be modified continuous, giving rise to $\{M^3{}_L\}=M^3{}_R$. Also $\{M^3{}_R\}$ x $M^1{}_m$ would give a common abstract modified 1-manifold description for the concomitant modified global path of 3-manifolds (i.e. mod V_Rs' 3-volume). So the MTCs are allegedly applicable mod concomitantly to all localities (i.e. all $V^3{}_L$s, and hence all locations in $V^3{}_L$) in a V_R, and mod concomitantly also applicable to all V_Rs including all CEv_Rs (and for all CE_{sc}s, CE_{void}s) for all stages of total universe $U_T=\{\{V_R\}_p\}$, and for all successive U_Ts member of $\{U_T\}=S$, the overall divergent System. So allegedly there would be no closed MTCs. Returning to the description of the alleged bulk scale motion of 3-volume, for $<BH_h$ there might perhaps always at least be a p_R scale positive definite radius between a so-called idealized CE 3-volume and the mathematical CE of BH_m. However such idealized 3-volume is just that, and is probably accompanied by considerable local turbulence which could also apply to the so-called mathematical

CE of BH_m. Or better yet, even at CE of BH_m, one allegedly has a p_R scale spatial 3-volume description with $\{p_R\}$->n, for an extremely large, but finite number. Also near to, and at, CE of BH_m, there probably would be associated copious {g.w.} generation. Also what might characterize the physical makeup along a_R of BH_m for vortical spiraling 3-volumes? One would probably still have a corresponding C_R (i.e. spatial 3-volume in a BH_m description) spacetime description, and thus probably $V_p=\{p_v\}$ physical vacuum on a finer concomitant scale to that of the coarser p_R scale. The alternative more conventional speculation would have just a Sg scale (i.e. <C_p Planck scale in lieu of p_R scale). Also would some p_R pass transiently through the mathematical axis of rotation (a_R), wherein a rotation component of force could seemingly transiently be in abeyance? Realistically, for near to CE of BH_m, and even for alleged respective polar vortices, one would have extreme p_R interaction locally, and hence just a coarser scale concomitant overall idealized bulk vortical motion might be descriptive; but perhaps not so for near CE of Bh_m. For BH_m, as mentioned, one might perhaps consider that one could depict some sort of polar vortex, since there would seem to be no rotation description for p_Rs transiently on a_R of BH_m. However, such conceptualization would seem to suggest that such depicted indentation would also be descriptive of the BH_h of a BH_m per se; that is, a BH_h would also seem to be indented about a_R of BH_m. Then would the exterior to modified BH_h, and even an exterior to modified ergosphere, extend perhaps all about a_R of BH through CE of BH_m mathematical construct, and out to other polar vortex in the another hemisphere of BH_m? Even though there would seem to be no rotation component of force for p_R about a_R, transiently at a_R of BH_m, still this would not necessarily imply an indented BH_h at the pole of BH_m. This would all seem somewhat analogous to a more conventional indentation of the ergosphere[51] at the pole of a rotating BH. Could one consider just electrically neutral

matter, such as neutrinos etc.(or also charged quanta accelerating in a magnetic field i.e. magnetohydrodynamics, MHD), and radiation, for along a_R, and inside the idealized spiraling 3-volumes of such polar vortex? Might then the origin of jets stem from such outward propelled neutral matter, g.w.s (both also carrying off angular momentum?), and radiation along a_R; or would a description of an outward spiraling of plasma and radiation closer to a_R, and inside the concomitant inward spiraling polar vortex (wherein the latter would be somewhat radially further from a_R), also be a contributor (in what proportion?) to what we eventually describe and observe as jets?

In a conceptualization of a BH_m description, utilization of just a 3-spatial description would seem simpler for a modified BH_h. For example, for overall modified BH_h description, allegedly there is concomitant upward (in northern hemisphere) and outward spiraling of bulk 3-volume of say $\{photon_R\}$. Interactions of $\{photon_R\}$ and of other p_R s in a given 3-volume, and between 3-volumes, is ignored in this idealized simplification. Then, in just a conceptualization sense, from an external conceptual perspective (even though modified BH_h of say $\{photon_R\}$ would not be physically observable from outside BH_m), one could perhaps consider a M^2 mod topology for a BH_h (i.e. modified BH_h) for a BH_m, rather than a mathematical s^2 topology. That is, s^2 mathematical notation would imply a mathematical real continuum, and that a mathematical s^1 closed curve can sweep out a mathematical s^2 surface. In contrast, for modified BH_h, in the above scenario, there is allegedly <u>no</u> closed curve of $\{photon_R\}$ just at so-called BH_h, sweeping out a 2-surface. Neither is there a 1_R sweeping out a mathematical s^1 closed curve, nor a math s^1 sweeping out a mathematical s^2. Nor are there considered to be $\{photon_R\}$ just 'hovering' at a certain radius from CE of BH_m, unable to escape from BH; <u>nor</u> are $\{photon_R\}$ considered just to be confined to a certain maximum radius of BH, yet propagating on a 2-surface (i.e. BH_h) at such a fixed radius. Rather one could have, in a simplified conceptual

description ignoring $_R$s interactions, a concomitant outward (radial component), and perhaps transverse component (orthogonal to radial components), and also a parallel to rotation axis component, of motion of idealized bulk 3-volume of {$photon_R$} and of other {p_R}. In a modified limit sense of such bulk 3-volume->0 for p_R scale, then concomitantly one could idealistically consider such outward and transverse and upward spiraling, for northern hemisphere, of a 2-shell of massless p_R (for example, {$photon_R$}), giving rise to a $M^2{}_m$ (i.e. modified BH_h). Such modified BH_h could then be considered as modified dynamic, in the sense of there being a continuous turnover of upwelling successive 2-shells of {$photon_R$}. Such a $M^2{}_m$ description for a modified BH_h, would then <u>not</u> imply a closed curve M^1 just at BH_h, sweeping out M^2, nor would one have one $photon_R$ at BH_h sweeping out M^1, just on modified BH_h. Hence in the above scenario, there then would be <u>no</u> s^2, s^1, mathematical analogy for a modified BH_h, nor a resulting mathematical s^3 analogy, for a BH_m 3-spatial manifold, being swept out by a mathematical s^2. Rather, successive idealized upwelling 2-shells of {$photon_R$}, with $M^2{}_m$, could be considered as sweeping out a $M^3{}_m$ for BH_m, and successively contributing to a $M^2{}_m$ modified surface for BH_m. Then such idealized upwelling {$photon_R$} allegedly would return vis a vis polar vortices back towards CE of BH_m. Thus might $M^3{}_m$ of BH_m still seem to be finite and modified unbounded, and hence modified closed? However, shortly this will be suggested <u>not</u> to be the case, if neither a mathematical s^3 nor s^2 description is implied. Also, such modified BH_h, in such above scenario, is envisaged to have an indentation of $M^2{}_m$ as part of alleged respective polar vortices; see figure 1. Hence a rotating modified BH_h would then allegedly <u>not</u> have just a mod oblateness description; rather also an alleged indentation of $M^2{}_m$ (i.e. modified BH_h), as part of an alleged polar vortex, is herein considered. Also then likewise analogously so for a herein so-called <u>modified</u> 'static' (i.e. 'stationary') limit (i.e. the outer boundary of the

modified ergosphere). That is, one could conceptualize such outer boundary of modified of ergosphere as a M^2_S extremely indented downward (but external to modified BH_h), in a polar vortex description of a modified BH_h. Hence such M^2_S of outer most aspect of ergosphere would also seem to give a modified vorticity description for $\{p_R\}$, inclusive of $\{photon_R\}$ in a modified ergosphere. The modified circulation of such p_Rs in ergosphere, and the inward spiraling for greater than and equal to modified ergosphere polar vortex down towards CE of BH_m, could seemingly be described. Also supposedly, there is ongoing new p_R creation in the modified ergosphere, and external to such ergosphere, in an extreme temperature environment, and also from inward spiraling p_R of especially an alleged internal accretion disk, and from off-disk $\{p_R\}$.Previously an idealized overall modified circulation of 3-volume was suggested as contributing to the sweeping out of what might appear as a modified Klein bottle modified mathematical surface. This would imply that for an idealized 3-volume, downward and inward spiraling as part of a polar vortex, would then describe the indentation of the modified BH_h down to near CE of BH_m. However the subsequent continuation of such idealized bulk motion of 3-volume of upward and outward spiraling, from near CE of BH_m, is not meant to imply that the latter still denotes some sort of persistence of a modified BH_h construct for such outward and upward idealized bulk motion. Also, neither is it implied that the modified BH_h indentation, vortex-like construct, remains descriptive about a_R of BH_m for deeply down towards, and near to, CE of BH_m; see Fig.1 of separate Bhfig.gif file. Rather, as mentioned, for near to CE of BH_m, possibly $\{p_R\}$->n for n a very large finite number, for extreme p_R interactions, and would suggest also an associated extreme {g.w.} gravity wave description (i.e. as in back reaction in a corresponding extremes of a C_R description). Hence the concept of a modified BH_h allegedly might then become no longer

descriptive for near to CE of BH_m. That is, near to, and at, CE_{BH}, perhaps the final evaporative stage of a BH (as well as the finer scale everywhere for all stages of V_R) is mimicked. That is, $\{p_R\}$->n for < what <u>was</u> previously described as a indented modified BH_h, for near to CE of BH_m, and concomitantly, allegedly, for what might be still considered as > modified BH_h (i.e. outside of BH_m, such as for a modified ergosphere, and for > mod ergosphere (for polar vortex), but yet near to CE of Bh_m. So then for near CE of BH_m, for possible $\{p_R\}$->n, for extremely large, but finite number of p_R, and for associated copious {g.w.} creation, the concept of outside versus inside of a modified BH_h would seem to loose its descriptivness. That is, the local energy density and copious {g.w.} creation, on either side of what was refered to as a so-called BH_h indentation, inwardly and downwardly spiraling as part of polar modified vortex, would allegedly be essentially the same. Hence the local gravitational influence (modified modeled as 3-curvature, in a 3 spatial simplification, or the corresponding 4-curvature, in a GRT conceptualization) would essentially have just extreme copious {g.w.} creation description for adjacent localities, that previously had an inside and outside of modified BH_h description.

Hence from a p_R's conceptual perspective, any just uni-directional crossing of a modified BH_h construct, would then <u>no</u> longer be distinguishable. In a classical C_R description, p_R outside a BH_h, inwardly spiral, but there is no outflow, across BH_h, of p_R for $<BH_h$. Also a back reaction, for $\{p_R\}$->n, giving rise to extremely rapid changes in local 3-curvature (i.e. {g.w.} in a corresponding 4-curvature in C_R), would also contribute to a blurring of a so-called conventional 'local' BH_h construct for near to CE of BH_m. Hence for near to, and at, CE of BH_m, the modified BH_h construct would seem <u>no</u> longer description. But yet for at CE of BH_m, still one would allegedly have a p_R scale description ($\{p_R\}$->n), and a 3- spatial description (or

corresponding C_R for 4-spatial description, even if one has just C_R={g.w.} description). Hence the BH_m construct, as in figure 1, would not then be considered as unbounded, and hence allegedly not closed. That is, one would not allegedly have a $M^2{}_{BHh}$ sweeping out an unbounded, and thus closed, $M^3{}_{BHm}$. Also $M^2{}_S$ for the modified stationary limit of modified ergosphere, would also allegedly become non-descriptive for near to CE of BH_m. So $M^2{}_S$ for a BH_m would also seem to be finite, bounded, and hence not closed.a possible modified topological description of a BH_m, and of a modified BH_h, could be given by utilizing concomitant outward spreading 3-volumes of {$photon_R$}, which for an idealized case of 3-volume->0_+, one could consider an overall 'global' 2-shell of {$photon_R$}. So the idealized 3-volume of {p_R} is considered in a modified limit sense of 3-volume -> a very small 3-volume, for p_R scale, and wherein just $photon_R$s are then ideally considered as part of an overall 2-shell, which concomitantly (in a MGS sense) outwardly and upwardly spiral, and then subsequently inwardly and downwardly spiral towards, and near to, CE_{BHm}. Analogously so for the southern hemisphere, in the same sense of rotation. So for BH_m construct, one might appear to have perhaps an overall $M^2{}_{BHm}$ surface sweeping out a BH_m 3-volume, with $M^3{}_{BHm}$ modified manifold (modified topology). However, as mentioned above, the BH_h construct is probably no longer descriptive for near CE BH_m of an indented polar vortex. Hence any $M^2{}_{BHm}$ description for modified BH_h would then be finite, bounded, and hence not closed. So then for successive {$photon_R$} 2-shells sweeping out of a modified mod dynamic modified BH_h, the $M^3{}_m$ of BH_m would also be finite, bounded, and hence not closed. So too, the considered analogy to a Klein bottle mathematical construct, would seem to break down near CE_{BHm}. But yet a modified BH_h might seemingly be considered as having a modified dynamic descriptiveness, comprised of a succession of idealized 2-shells, each considered as consisting of

$\{photon_R\}$, with $M^2{}_{BHm}$ modified topology, incessantly outward spiraling up to, and transiently contributing to, what one could refer to as a modified BH_h. Also one could refer to the concomitant 3-volume of $\{p_R\}$ arriving at (and forming) a so-called overall modified BH_h. The latter might be somewhat more descriptive, and somewhat analogous to a corresponding C_R description, wherein the boundary of a boundary is zero description (delta delta=0), would allow for just a 3-volume conceptual description for BH_h of a 4-spatial BH construct in a C_R description.

In the BH_m description, a modified BH_h shall be denoted by a modified $M^2{}_{BHh}$ notation, or by just a mod BH_h notation. For BH_m, a $M^3{}_{BHm}$ is <u>not</u> meant to imply any real number continuum, nor conventional s^3 mathematical description. Hence, as mentioned, also <u>no</u> analogy to a mathematical s^1, just on mathematical s^2, and sweeping out a mathematical s^2; <u>nor</u> of one $photon_R$ sweeping out a mathematical-like s^1, just on a mathematical-like s^2 for modified BH_h. So the modified $M^2{}_{BHh}$ might seem somewhat like the earlier described $M^2{}_m$, for sweeping out V_R's $M^3{}_m$. However V_R is finite modified <u>un</u>bounded, and hence closed. For V_{Rp} stages, one might utilize neutrinos, as a $\{p_R\}$ example, as part of an idealized $M^2{}_m$ sweeping out of $M^3{}_m$. For use of neutrino as a p_R example, then just stages after recombination, and for before corresponding BC stage, would seem suitable for an idealized $M^2{}_m$ sweeping out of a $M^3{}_m$. So $M^2{}_m$ wouldn't seem to become non-descriptive for any stage of an idealized $\{_R\}$ 2-shell set of photons expansion, or contraction, for throughout V_R, <u>un</u>like for $M^2{}_{BHh}$ case. Also, in the schematic depiction of BH_m in figure 1, there is considered to be no overall 'global' 2-torus-like (T^2), nor 3-torus-like T^3, description, since modified BH_h is allegedly no longer descriptive for near to CE of BH_m. Also BH_m does not allegedly have just an oblateness descriptiveness, although for a rotating BH_m, an equatorial bulging, with respect to a polar flattening, even for

disregarding indentation, would seem increasingly reasonable, as per numerical models of trapped surfaces giving rise to distorted BH_h.[460] For Figure 2 of appendix, for BH_h, the mod oblateness is just schematic, and probably exagerated. But for schematic successive more inward radii, might not the mod oblateness, and thus the gravitational quadrapole, likely become more accentuated - thus consistent with copious g.w. creation? A BH_m, with a so-called $M^3{}_{BHm}$, and with a modified BH_h, with a $M^2{}_{BHm}$ description, modified topologies, might seem different from V_R's $M^3{}_R$ and $M^2{}_R$, and from local 3-volume($V^3{}_L$) with $M^3{}_L$, and local $M^2{}_L$, modified topologies. This might seem so, even in spite of some similarities, as denoted in figure 3. One of the differences is that a modified $M^2{}_{BHh}$, and hence $M^3{}_{BHm}$, allegedly become <u>non</u>-descriptive for near CE_{BHh}, whereas in $V^3{}_L$, there is still allegedly a $M^3{}_L$ description for $\{p_R\}$->n for near to, and even at, CE of BH_m. So $M^2{}_{BHh}$, as for alleged polar vortex, and hence $M^3{}_{BHm}$, would allegedly no longer be descriptive for near to CE of BH_m. But yet the corresponding C_R, and its 3-spatial component description, are still allegedly descriptive. Hence the notation of BH_m, distinguishable from a more conventional interpretation of BH solution of GRT equations. One can then describe a modified $M^2{}_{BHh}$ (i.e. modified BH_h) as bounded, and thus such modified $M^2{}_{BHh}$ then allegedly becomes no longer descriptive for near to CE of BH_m. Hence a modified $M^2{}_{BHh}$ would differ from $M^2{}_L$ of $V^3{}_L$, since the latter, although also modified bounded, based on the spreading of $\{photon_R\}$ into adjacent $V^3{}_L$s, still would have a $M^2{}_L$ description.

Of course, physically for finer (p_R->n scale), one would <u>no</u> longer have a 2-shell $\{photon_R\}$ with $M^2{}_L$, because of interactions. Hence $M^2{}_L$ would then just be an idealization. So $M^3{}_L$ is herein considered modified bounded, finite, and thus not modified closed, and also <u>not</u> modified <u>dis</u>continuous. And BH_m has $M^3{}_{BHm}$, which is bounded, finite, and hence also not modified closed, and also allegedly

non-descriptive (hence modified M^3_{BHm} and modified M^2_{BHh} could be considered as modified discontinuous) for near to CE of BH_m, for alleged finer p_R scale of $\{p_R\}$->n, even though there is still allegedly a p_R, and corresponding C_R, description of some sort (but not a conventional BH_h or BH description) for near to, and even at, CE of BH_m. So V^3_L modified topology, M^3_L, would then seem invariant; and even in principle, M^2_L might be considered invariant for near to, and even at, CE_{BHm}. However, as mentioned above, physical interactions would render $\{photon_R\}$, or even set of neutrinos $\{L_{oo}\}$, or even extremely interacting {g.w.}, (all with M^2_L), non-descriptive for the alleged extreme of finer energy scale of $\{p_R\}$->n, {g.w.}->n. Still for the extreme deformations of a 3-manifold for near to, and even at, Planck scale C_p (even though probably non-differentiable i.e. not smooth), still herein the mod continuity of such 3-manifold (M^3_L) is still considered descriptive.So the construct of M^2_L, utilizing $\{p_R\}$, sweeping through (out) V^3_L, would just then be an idealization. But still might the modified topology of BH_m with M^3_{BHm}, and modified BH_h, with M^2_{BHh}, seem to differ from M^3_L of V^3_L, since the former would no longer be descriptive, since modified M^2_{BHh} construct allegedly becomes no longer descriptive for polar vortex -> near to CE of BH_m? But allegedly there's still a p_R scale (>C_p) description. So might a change in modified topology type seem to distinguish M^3_L from M^3_{BHm} (with modified M^2_{BHh}) for polar vortex -> near to CE of BH_m? However both BH_m (M^3_{BHm}) and V^3_L, with M^3_L, would still be finite, modified bounded, and hence not modified closed, and allegedly one also has the same mod continuity for <BH_h as for >Bh_h. So superficially, an alleged new conceptualization of a modified BH_h (with M^2_{BHm}) might seem to differ from M^3_L of V^3_L; but yet herein the alleged mod topology is considered to be invariant for throughout V^3_L, (and for $\{V^3_L\}=V_R$), whether for >BH_h, or for <Bh_h. Even an

idealized $M^2{}_L$ modified point source is supposed to be descriptive for positive definite $V^3{}_L$->0_+ stage, such as for r_m minimum stage. As mentioned previously, for r_m minimum stage, one still allegedly would have V_{Rp}=$\{V^3{}_L\}$. However, as also mentioned above, physically, $\{photon_R\}$ interactions would prevent utilization of any spatial 2-shell outward propagation of $\{photon_R\}$ from near to, and at, CE_{BHm} for $\{p_R\}$->n, for a very large, but finite, number.

Appendix Fig.3: Some comparative topological properties

	$M^3{}_{BHm}$	$M^3{}_R(V_R)$	$M^3{}_L(V^3{}_L)$	
finite	+	+	+	
mod bounded	+	-	+	
mod closed	-	+	-	
	$M^2{}_{BHh}$	$M^2{}_L$->	$M^2{}_G$->	$M^2{}_R$*
finite	+	+	+	+
mod bounded	+	+	+	+
mod closed	-	-	-	-

* in a propagation sense outward from source, and in an orthogonal sense to an idealized 2-surface shell, of say photons, or of neutrinos.

For $M^2{}_L$, $M^2{}_G$, $M^2{}_R$, one could describe a lack of modified boundedness, descriptive for such modified 2-surfaces per se, in the sense of there being no M^1 closed curved sweeping out a M^2 surface. However, in an idealized endless propagation sense, $M^2{}_L$->$M^2{}_G$->$M^2{}_R$ is considered as giving rise to (denoting) a modified unboundedness of $M^3{}_m$ of V_R. Also the above mod topological differences noted for between $M^3{}_R$ of V_R and for $M^3{}_{BHm}$, would seem consistent with the conceptualization of not considering the 'universe' (i.e. V_R)as a modified BH.What other line of reasoning might be consistent with an alleged interior off-equatorial redistribution (i.e.

overall modified circulation) for modified $<BH_h$? Would a probably mod oblateness for a rotating BH (with a quadrapole description) of a conventional BH construct, perhaps also have some sort of off-equatorial re-distribution of mass, rather than just perhaps an inward spiraling of $\{p_R\}$ in just some sort of internal accretion disk near the equatorial plane of a rotating BH? The construct of BH_h refers to the maximum radial outward component extent for $photon_R$ null geodesics in C_R. Such an off-equatorial redistribution of inward spiraling $\{p_R\}$, for $<BH_h$, would not seem so unreasonable. Once again, we shall reiterate an idealized speculative scenario of some sort of modified streamlined bulk 3-volume motion of $\{p_R\}$, with some sort of spiral path upward and outward, in northern hemisphere, out to a so-called modified BH_h construct, herein comprised transiently of idealized 3-volumes of $\{p_R\}$ and/or of $\{photon_R\}$, with a maximum radius from CE of BH_m for such spiral path, corresponding to a modified BH_h. Then subsequently, there allegedly might be inward spiraling about a_R of BH_m, and also downward spiraling towards CE of BH_m construct. However, there would also probably be copious $\{p_R\}$ interactions and dissipation, not only for within a so-called larger idealized 3-volume, but also even between adjacent idealized spiraling 3-volumes. Hence such < modified BH_h description of an idealized 3-volume bulk motion differs markedly from the $\{V_R\}$ construct, wherein for the latter, each V_R 3-volume allegedly resides in an $\{\ \}$ context, and wherein there would thus naturally be no dissipation from V_R into $\{\ \}$ context, in such a scenario. For modified BH_h, such local $\{p_R\}$ interactions in 3-volume, and at so-called outer extent of such idealized 3-volume, and hence between p_Rs of different 3-volumes, would not exclude a concomitant larger scale bulk motion of 3-volume of $\{p_R\}$. The magnetosphere model, external to conventional BH, is an example both of copious p_Rs interactions, and yet concomitant larger scale bulk motion, as in electric currents (charged p_R), i.e. a plasma of

{p_R} flowing along magnetic field lines - magnetohydrodynamics.[49] Turbulence, and hence dissipation and enhancement of entropy generation for BH_h, could perhaps even be inferred from the appearance of a somewhat oblateness feature for a rotating BH of a conventional BH_h construct. That is, an approximate spherical shape of BH_h would seem to maximize the surface area (S.A.); wherein the overall entropy of BH (s_{BH}) is proportional to one-fourth S.A. Actually, $s_{BH}=1/4k_B S.A._{BH}$, wherein k_B denotes Boltzman's constant.[45,49] s_{BH} could be considered as the logarithm of the total number of different distinct quantum mechanical arrangements, from which a BH could be made, or the number of different quantum mechanical distinct arrangements for <Bh_h.[549]

So an approximate spherical shape (but probably with some oblateness for a rotating BH) of a conventional BH_h might seem to be consistent with an alleged ongoing maximizing of entropy theme for <BH_h, as well as for throughout V_R, V_{Rp}, for <u>all</u> stages, in comparison to alternative scenarios. How could one then reconcile such an entropic argument, suggesting an approximate spherical shaped conventional BH, with figure 2 of appendix for BH_m? In figure 1 of herein appendix summary, the alleged no longer descriptive modified BH_h for near to CE of BH_m, and the non-spherical shape of a modified BH_h (with indentation of polar modified vortices) would seem, comparatively, to further <u>increase</u> the S.A. of the modified BH_h; hence consistent per se with a greater entropy description for such BH_m (s_{BHm}). Also the alleged p_R ->n for near to CE_{BHm} and even for at CE_{BHm}, and the herein alleged deep seated origin of beam-jets from out of a polar vortex, would seem consistent with a greater total number of different distinct quantum mechanical arrangements which might seem to characterize such a BH_m. Hence the modified BH_h and BH_m would seem to be consistent with a further alleged ongoing maximizing of the entropy (s_{BHm}), in comparison to just a spherical (or just a mod oblateness) conventional BH. <u>Just</u> a modified streamline pattern description of a

modified 'global' circulation (i.e. off equitorial re-distribution) of 3-volumes, in a spiral pattern, would not seem sufficient, even if there were copious $\{p_R\}$ interactions inside such idealized 3-volumes. So an analogy to the dynamics of a perfect fluid, wherein the latter has no shear, stress, and hence no viscosity, and no anisotropic pressure, and no turbulence nor dissipation, would not seem realistic for a modified BH_h description. Alternatively, an analogy somewhat similar to an external magnetosphere model for the magnetized accretion disk of a rotating BH, might seem somewhat adaptable for the modified BH_h description. That is, a large scale modified overall idealized mod circulation, C_m=sigma$_i$ Vf_m delta s_i, description for off-equatorial redistribution of 3-volumes might seem possible. However, also, concomitantly, one could have copious $\{p_R\}$ interactions, and turbulence of modified streamlines. The resultant dissipation would still also seem descriptive, and consistent with an alleged ongoing maximizing of entropy. The latter alleged ongoing maximizing of entropy for $<BH_h$ for BH_m would seem consistent with the depicted shape of BH_h in figure 2 of appendix. As mentioned above, also such alleged ongoing maximizing of entropy would seem consistent with the maximizing of MTCs deltaphi$_m$, deltaS_{Tm}, {deltaI_L}, delta$V^3{}_L$, deltaV_R, deltas_L, wherein deltas_L=sigmdelta$_i$ s_i denotes a conceptual mathematical summation of local entropy generating processes.BH rotation per se also contributes substantially to the K.E. of a BH. See appendix, and astro-ph 9909195 for terminology. And such BH rotation K.E. can be converted into electromagnetic energy in the magnetosphere of a conventional BH with a magnetized accretion disk.[49] And there is probably considerable turbulence in such magnetosphere. Hence, for a plausible overall rotational component of $\{p_R\}$ for $<BH_h$, rotational K.E. could likely contribute substantially to entropy generation generating processes, such as associated perhaps with turbulence, as for internal magnetic field lines for $<BH_h$. Also tidal deformation of BH_h (enhance change in C_R curvature, and thus g.w. creation) could contribute to entropy generation.[49]

Likewise for C_R for $<BH_h$, deformation (i.e. change in curvature and g.w. generation), associated with rapid re-distribution of mass, as in turbulence (for example, magnetohydrodynamic turbulence of alleged internal magnetic fields, as well as for the re-distribution of angular momentum of mass and energy, such as for copius neutrinos and g.w.s, for nearer to CE_{BHm}), would seem consistent with an increased contribution to entropy generation - consistent with an alleged theme of an ongoing maximizing of entropy. So not only conventional BH mechanics, but also an external, and internal, accretion disk, and an off-equatorial internal and external BH_m magnetosphere model, could perhaps all contribute to a $<BH_h$ description, and would seem consistent with an enhanced entropy generation, and hence consistent with an alleged ongoing maximizing of entropy, $deltas_L = sigma_i deltas_i$; and hence also consistent with the alleged mod concomitant homeomorphic ongoing maximizing of all other MTCs. So for modified $<BH_h$, one might have processes somewhat similar to conventional $>BH_h$, as for example wherein gravitational and rotational energy of an accretion disk is converted into thermal, kinetic, and magnetic field energy.[49] And viscosity could be associated with turbulence of $\{p_R\}$, and from turbulence of magnetic field lines etc. Thermal energy would keep an accretion disk ionized, and thus electrically conducting, and thus have associated magnetic fields. And such hot accretion disk, with magnetic fields, would eventually largely spiral into $<BH_h$.[49] So a less than and equal to modified BH_h description might very reasonably also have some sort of plasma, with magnetic field and electric field description, and also some off-equatorial redistribution of energy and angular momentum, with an overall so-called modified circulation, perhaps somewhat analogous to an external magnetosphere consisting of magnetic field lines and plasma (hot ionized gas). Considerable turbulence, as for in an external disk and magnetosphere, could also have analogies for modified Bh_h. What form might such entropy generating turbulence, for plasma and magnetic field, take on for modified BH_h? Perhaps deterministic

chaos, with comparatively few independent variables (i.e. a low dimensional phase space description)?[84] Usually, deterministic chaos is not considered descriptive for the $\{p_R\}$ scale description. Still such a deterministic chaos scenario shall be herein explored, for any possible (in part) pertinent analogous descriptiveness. Perhaps such a description could be simulated via a variation from an idealized modified perfect fluid modified fluid dynamics, wherein for the latter one would have the previous described so-called streamlined overall modified circulation, C_m=sigma$_i$ Vf_m delta s_i of 3-volumes. That is, when might one possibly have the onset of such alleged self-similar turbulence, with perhaps changing interspersed localities of streamlined flow, and localities of randomness on an ever finer finite p_R scale (in such a general overall idealized C_m description), for $<BH_h$? Such a possible scenario of the mixing of islands of stability and adjacent areas of instability on all scales (self-similar) is called intermittency, and is characteristic of deterministic chaos.[84] In fact, for a weakly perturbed integrable Hamiltonian system, complete chaotic instability to trajectories, without any regular motion of trajectories (i.e. without any islands of stability), is impossible according to the KAM (Kalmogorov, Arnold, Moser) theorem.[84] Contrarily, would the turbulence and interactions for accretion disk and external magnetosphere, and thus for similar analogous turbulence for $<BH_h$, seem to have more of just a Gaussian randomness?

Then one would seem to have a great many variables. Thus would the turbulence be more homogeneous, without any local idealized streamlined perfect-fluid-like description, on all finer scales? So then if an external accretion disk and external magnetosphere could serve as analogy for a < modified BH_h description, then wouldn't the description of fluid dynamics, as for plasma and as for magnetic fields (lines), and the associated turbulence for $>BH_h$, serve as a possible model for $<BH_h$ for a BH_m? If a deterministic chaos description were, in part or in total, appropriate for modified $>BH_h$ and for modified $<BH_h$, then wouldn't there be an attractor description? That is, only a

limited region of mathematical phase space would then be occupied by such a modified fluid dynamic turbulence description, if based just upon deterministic chaos. Contrarily, a Gaussian randomness (white noise-like) description could occupy almost any finite region of a phase space. Hence then wouldn't a Gaussian-like randomness description, with a very large number of independent variables (degrees of freedom), say for modified $<BH_h$ description of turbulence, be more consistent with the maximizing of S.A. of a BH_m, and hence more consistent with the alleged ongoing maximizing of entropy for BH_m? That is, a Gaussian randomness has a greater entropy than deterministic chaos, in that the former denotes more rearrangements. That is, any phase space revisited by the former is greater than for deterministic chaos phase space. The overall entropy of BH (s_{BH}) proportional 1/4S.A., and the s_{BH} construct is considered herein to denote the macrostate characterized by the greatest number of finite different arrangements of quantum states for $<BH_h$. But if a BH_m had respective polar vortices, wouldn't this alter the S.A. of BH_h of BH_m? Such increase in S.A. would then seem consistent with a greater entropy for BH_m, and hence consistent with an alleged ongoing maximizing of entropy. Also <u>if</u> a $<BH_h$ description could be <u>somewhat</u> modeled after an external accretion disk and magnetosphere turbulence description, then wouldn't the modeling of such turbulence for a $<BH_h$ be similar to a modified $>BH_h$ description? Thus by computer simulation of the turbulence, associated with an external accretion disk and with a magnetosphere, perhaps a somewhat analogous model of alleged turbulence could be inferred for < modified BH_h. Even <u>if</u> one could simulate the modified fluid dynamic turbulence for > modified BH_h, with just a comparatively few number of independent variables, and thus infer such a model for < modified BH_h, still a very large number of degrees of freedom (i.e. a very large number of independent variables), as in a Gaussian-like randomness, would still seem more consistent with an alleged concomitant maximizing of S.A.; hence

allegedly maximizing of entropy for a BH_m, in comparison to other scenarios. Also the concept of an ongoing maximizing of BH_m entropy would seem consistent with the concomitant alleged ongoing maximizing of {$deltas_L$}, wherein $deltas_L = sigma_i$ delta s_i, $deltasv_R = sigma_i deltas_L$, delta $sU_R = sigma_i$ delta sv_R, mathematical summations, and with change in mod information $deltaI_L$ etc., non-geometric MTCs, and with alleged mod concomitant ongoing maximizing of geometric MTCs, $deltaS_{Tm}$, $deltaphi_m$, $deltaV^3{}_L$, $deltaV_R$. Also the previously described mathematical idealized overall modified circulation for 3-volumes for <BH_h, $C_m = sigma_i V_{fm}$ deltas, with streamlined motion, would <u>not</u> necessarily imply that physically there was such motion, which then secondarily developed turbulence. Hence there might have always been a turbulent description for magnetosphere and accretion disk and for < modified BH_h analogies, since their formation. Hence then a many variable description might have been always descriptive, rather than just a few variable deterministic chaos description, as for the onset of turbulence from a regular laminar (streamlined) dynamic motion. Also perhaps some complex turbulent system, with many independent variables, as a result of dissipation, could give rise to a simpler fewer variable descriptive model of such turbulence.[91] Perhaps, there is also in part an analogy for the so-called early BB stage of inside our 'universe' (i.e. for V_{Rp}) for near r_m minimum. That is, would Gaussian-like randomness with a very great, but finite, number of degrees of freedom (independent variables), such as for the number of species of p_R ->n, wherein n is extremely large, but yet finite, be more descriptive than a deterministic chaos randomness description, wherein the latter has a fewer number degrees of freedom? For the former, perhaps somewhat of a Hagedorn-like exponential increase in the number of quantum states,[19,300] and in their pattern of interactions, and even just for their spatial rearrangements, might seem descriptive for the very early 'universe' i.e. $V^3{}_L$ local 3-volume member of V_{Rp}, and allegedly for the local finer scale for all stages. For deterministic chaos, there would

have to be localities in phase space wherein non-randomness is characteristic i.e. 'islands of stability',[84] and also regions in phase space wherein randomness would be characteristic, and where there would be self-similarity to such a pattern on a finer p_R scale. But such a deterministic chaotic randomness description usually has a described onset from a classical dynamic description, wherein there are initial conditions and sensitivity to such initial conditions, so that some restricted range of parameters results in a classical path taking on a randomness appearance. However, the early 'universe' (i.e. inside V_{Rp}) is not considered to have had a classical description, in lieu of a real quantum $\{p_R\}$ description. Also the initial conditions in a conventional BB scenario have to be 'put into' one's model; that is, they don't seem to arise naturally. Contrarily, in the SRM, model, there are considered to be no initial conditions. Rather one has just the continuation of the inward log spiral modified global path of V_{Rp} through a finite r_m minimum transient stage, and then subsequent outward log spiraling. Hence mod concomitant (in a MGS sense), local 3-volume(s), $V^3{}_L$ member of $V_{Rp}=\{V^3{}_L\}$, transiently reaching a finite minimum 3-volume at r_m minimum. That is, there is allegedly always a finite minimum 3-volume of $V_{Rp}=\{V^3{}_L\}$, on a p_R scale, for $V^3{}_L \to 0_+$ (positive definite), containing an extremely large, but finite, number of p_Rs, for V_{Rp} transiently passing through r_m minimum radius stage. So for the early 'universe' (i.e. V_{Rp}), locally, a very large but finite number of p_Rs (hence a very large but finite number of degrees of freedom, and thus an analogy to a Gaussian randomness description), would seem to be more consistent with the theme of the alleged ongoing maximizing of MTCs, inclusive of the alleged ongoing maximizing of local entropy, $\text{deltas}_L = \text{sigma}_i \text{ delta } s_i$, as well as with the mod concomitant $\text{delta sv}_{Rp} = \text{sigma}_i \text{ delta } s_L$, and as well as with the concomitant $\text{deltasU}_T = \text{sigma}_i \text{ deltasv}_{Rp}$. Also such a description would seem consistent with $\{\text{deltas}_L\}$, $\{\text{deltasv}_{Rp}\}$, $\{\text{deltasu}_T\}$ MTCs alleged ongoing maximizing.

However, if consistency with the alleged ongoing MTC maximizing is important, then why would a deterministic chaos description, with a comparatively few number of independent variables in a local description, (when compared to a Gaussian-like randomness description, wherein for the latter there are a much greater number of independent variables), ever be a more suitable description? But a deterministic chaos description describes the onset of an instability, with a randomness appearance to the regular motion of dynamic systems, wherein the latter could be considered non-dissipative, or with very little dissipation. Hence deterministic chaos, with randomness appearance, but actually still islands of stability on all scales (i.e. intermittency),[84] occupying a restricted region of phase space, would contribute (give rise to) more entropy generation than if just a local dynamic regular (stable) motion remained descriptive; for example, as for streamline (laminar) fluid dynamic flow versus onset of turbulent motion. Hence such a deterministic chaotic randomness description, for onset of instability of local dynamic motion, would then seem to contribute to more entropy generation than if there were just stable regular dynamic motion. Hence a deterministic chaotic onset of instability of dynamic systems would seem to be also consistent with, and contribute to, an alleged ongoing maximizing of MTC, $\{deltas_L\}$, in comparison to alternative scenarios. So when one compares a Gaussian-like randomness description of turbulence, with a large number of degrees of freedom, to that of a deterministic chaotic turbulence description, with just a comparatively few number of independent variables, the former would seem more consistent with an alleged MTC ongoing maximizing of local entropy. But yet the description of the onset of turbulence in hydrodynamics seems to have the persistence of 'islands of stability' (i.e. regular laminar motion), together with regions of turbulence (instability), in a self-similar pattern for the finer scale.[91] And such latter modeling would seem more characteristic of the onset of hydrodynamic turbulence, than would an ever-greater number of independent variables randomness description of hydrodynamic turbulence.[91,96] So the onset of instability of systems may very well have a deterministic chaos intermittency (i.e.

self-similar islands of stability and randomness) description on an ever finer classical finite scale. Hence this would seem consistent with a contribution to the increase in entropy, more so than if such dynamic systems did not have such instability. However, it may not necessarily follow that all descriptions of turbulence (apparent randomness) in nature (for example, as for in a magnetized accretion disk, and for magnetosphere of rotating BH), and for $<BH_m$, have such intermittency (as in deterministic chaos) of stable and unstable motion descriptions on an ever finer finite p_R scale. Hence some (many?) descriptions of observed turbulence in nature may have a very high dimensional (many variable) phase space description (such as for weather and climate systems[301]), without any intermittency, such as in deterministic chaos. That is, a very large number of independent variables (degrees of freedom) might characterize such turbulent descriptions.[96,97] Also other models for onset of turbulence from laminar flow, such as cellular automata, may be useful models.[97,98] So both a few, and many, independent variables (degrees of freedom) description may be useful in a randomness description of turbulence, for different settings. However, both such descriptions, for their appropriate settings, might seem to further enhance the local generation of entropy, and hence both would seem to be consistent with an alleged ongoing maximizing of MTC {delta s_L}. Once again reiterating (for some experimental examples), for actual observed laminar streamline flow going to turbulence, deterministic chaos seems not only to be a good idealized model, but also an actual physical description.[91,96] However, this would not necessarily mean that all cases of turbulence in nature, as for on p_R scale, such as for external magnetosphere and accretion disk models, and for alleged analogies for modified $<BH_h$, need have a low dimensional, and thus restricted region of phase space, description (i.e. with also an intermittency description). For example, a Gaussian randomness description of turbulence would seem to have a great number of independent variables covering most of the phase space (finite), and without an intermittency conceptualization. Also a larger scale bulk motion (i.e. so-called modified circulation) of energy,

consisting of matter and radiation quanta, together with a concomitant smaller scale (more localized) turbulence description, for BH_m, would not seem so inconsistent. For example, the overall bulk motion inward spiraling of matter and radiation of an accretion disk of a BH, probably would have concomitant more localized turbulence description.[49] Also the model of the larger scale bulk motion redistribution of matter and radiation quanta off of a magnetized accretion disk, giving rise to so-called magnetosphere of a rotating BH, concomitantly probably has a local turbulence description.[49] Analogously, for $<BH_h$ for a rotating BH_m, the bulk motion inward spiraling of matter and radiation of an alleged internal (magnetized plasma, or not) modified accretion disk, would not seem inconsistent with a concomitant more localized turbulence description. Also for less than and equal to BH_h, a bulk motion re-distribution of energy (matter and radiation) off of the approximate equatorial plane (i.e. internal modified accretion disk, perhaps) for $<BH_h$ would not seem inconsistent with a concomitant more localized turbulence description for off-equatorial localities. Also then perhaps some sort of $<BH_h$ internal modified magnetosphere analogy, and also associated magnetized plasma accretion disk, somewhat similar to $>BH_h$ external magnetosphere, might have some descriptiveness. Such $<BH_h$ magnetic field lines, and associated plasma, would be restricted to a $<BH_h$ spatial 3-volume (and for concomitant $<BH_h$ spacetime C_R descriptiveness), except for alleged polar vortex and beam jet regions. So the previous described off-equatorial plane bulk motion redistribution of energy (i.e. modified overall circulation, $C_m = \text{sigma}_i Vf_m \text{delta } s_i$), and a concomitant more localized turbulence description, would not necessarily seem inconsistent; rather perhaps both can be concomitant descriptions, but on different scales. Such a turbulence description for < modified BH_h could seem consistent with a maximizing of S.A. of BH_m (in addition to the alleged origin of beam jets deep in a so-called polar vortex which would contribute to further entropy generation), and hence consistent with an alleged ongoing maximizing of entropy of a BH_m, in

comparison to alternative scenarios. So in general, such turbulence description for modified $<BH_h$, and for modified $>BH_h$, would seem consistent with an alleged ongoing maximizing of entropy MTC, {delta s_L}, and hence consistent with an alleged ongoing maximizing of other alleged concomitant MTCs, deltaphi$_m$, deltaS_{Tm}, delta$V^3{}_L$, deltaV_R, deltaI_L. So the more conventional $>BH_h$ accretion disk, and $>BH_h$ off-equatorial plane redistribution of energy into a magnetosphere, and consequent bulk motion, and also concomitant more localized turbulence, might all perhaps serve as an analogy, in part, for a $<BH_h$ description. A jet (and so-called more centrally descriptive beam phenomena),inclusive of E-M radiation, and of matter, and probably associated magnetic fields, have been associated with active galactic nucleus (AGN) descriptions, and have been described as possibly related to a central rotating BH.[49]

A rotating BH_m, in associated magnetic fields, but at lesser radii (i.e. closer to a_R) than for a concomitant inward spiraling polar vortex, together with radiation creation from accelerating charged quanta, interactions, turbulence etc., might be descriptive for the inner most origin of an alleged beam, and their respective jets, of an AGN, and hence of BH_m, in the herein scenario; see appendix fig 1. For alleged <u>inward</u> funneling about a_R of BH_m, there would seem to be an increase in KE_L (and acceleration), and angular momentum, for such idealized bulk 3-volumes, and of charged quanta plasma, with associated increasing magnetic field energy of twisted lines. Hence there would seem to be a contribution to an increasing more energetic E-M radiation description. Also there would be concomitant decrease in PE_L of such bulk 3-volumes, and of component relativistic $\{p_R\}$ (inclusive also of neutrinos?) for inward spiraling (funneling) of such alleged polar vortex about a_R down towards CE_{BHm}. For observed jets, an orientation along a_R of BH_m (and hence along a_R of herein considered central engine of AGN), but not necessarily for the axis of rotation of the host galaxy, would seem to be the geometric preferred direction, seemingly perhaps related to the driving of an accretion disk

into the equatorial plane of BH (Bardeen-Peterson effect), with associated viscosity contribution, and an associated release of gravitational energy.[49] Rotational energy of a BH, and of an accretion disk, can also contribute to the energy of the magnetosphere.[49] Perhaps also, analogously, the decreasing gravitational potential energy, and the increasing rotational KE_L of inward spiraling $\{p_R\}$, as components of concomitant larger scale polar vortex, for down towards, and near to, CE of BH_m, might contribute to an extreme local kinetic energy of relativistic p_R s, and of electromagnetic radiation and magnetic field energy, associated with concomitant jet formation. The jet's persistence might then perhaps be related to extremes of energy, since for a polar vortex model, one allegedly has such an extreme gravitational potential well, fueling such alleged polar jet. Also such an extremely deep gravitational potential well of an alleged polar vortex, fueling, and allegedly initiating, an alleged beam (initially comparatively narrow), and then resultant jet, might seem to perhaps obviate (or comparatively reduce) any necessary role of a thick disk, or torus, as contributing to a much broader collimation funneling zone. Could one then consider the possible inward continuation of funneling (i.e. polar vortex), giving rise eventually to a no longer descriptive modified BH_h construct? See earlier discussion. Could one then entertain the possibility of a beam jet of radiation, neutrino, and plasma description, for approximately along, and about, a_R of BH_m of AGN, with also outward spiraling (?) plasma and associated magnetic fields, and predominant carrying off of angular momentum by neutrinos and also by g.w.s), as arising out of such concomitant inward polar vortex? Such a suggested polar vortex origin of an alleged polar jet for BH_m, and herein assumed for AGN, might not be directly observable. But perhaps the waveform[481] of g.w.s generated deep within the polar vortex might provide an observable signature. More recently, analysis of the case of non-equatorial inspiraling of a massive body into a BH, has been discussed.[608] Gravity wave generation from such inspiraling mass, for rapidly rotating BH, should give a gravity waveform that could be perhaps better detected in terms of it's components - a set of

different harmonics (amplitude and phase) of the fundamental orbital frequencies of such inspiraling mass.[608]
The dominant contribution to the waveform is quadrapole; but for later inspiraling, deeper in gravitational well, then other harmonics contribute strongly.[608] For such case wherein large mass ratios 10^{-3}-10^{-7} (of inspiraling mass to BH mass) were considered, then LISA spaceborn g.w. interferonmeter detection of waveform would probe Kerr metric spacetime structure to high precision.[608] Inspiraling of mass depends on the structure of spacetime, and not upon the nature of inspiraling matter.[608] Also advection dominant accretion flows (ADAF) would have negligible effect on the waveform generated by such inspiraling mass. A BH has only 2 independent multipole moments (mass and spin); whereas LISA likely would measure 3, and perhaps 4-5, multipole moments of inspiraling mass, depending on the mass ratio of inspiraling mass to BH mass.[608] Also, rather than a special case of an equatorial and circular orbit for subsequent inspiraling mass, one might consider more generic orbits, such as inclined and non-circular, which would allow more acccuracy in determining multipole moments, and hence more detailed probing of the Kerr metric spacetime.[608] Also tidal coupling of inspiraling mass distorts the BH_h, which results in a leading bulge, and such bulge then exerts a torque on the inspiraling idealized body; thus slowing inspiraling somewhat, for rapidly rotating BH.[608] Such tidal coupling of inspiraling mass should give a signature in the g.w. data - hence a probe of a strong gravitational field of a fast rotating BH (Kerr metric) spacetime.[608] Might such analysis suggest another approach to the detection of an alleged polar vortex of a modified BH? That is, might LIGO or LISA, or another specifically designed g.w. interferometer, perhaps detect the gravity waveform, or better yet, the harmonics of the fundamental orbital frequencies of a mass inward and downward spiraling into an alleged polar vortex of a modified BH (BH_m) - such as for a yet to be detected face on (or for acute angle of rotation axis to line of sight, in analogy somewhat to Seyfert galaxies) comparatively nearby microquasar (x-ray binary with BH), or for a face on AGN i.e. blazer? Such non-circular and non-equatorial polar vortex extreme

inspiraling would seem to allow more accurate determination of multipole moments, and hence more detailed probing of the Kerr metric spacetime for such alleged polar vortex. Also since advection dominant accretion flows (ADAF) would have negligible effect on the waveform generated by such inspiraling mass, might one have in part a way of distinguishing such gravity waveform (and/or harmonic components) signals originating from such alleged polar vortex spacetime structure versus say equatorial inspiraling mass from models of an accretion disk's LSO (last stable orbit) for an inspiraling mass? Also deeper in alleged polar vortex (i.e. deeper in gravitational well), other harmonics would seem to contribute strongly - hence giving a more distinctive signal of such alleged exotic spacetime structure? Also as mentioned, tidal coupling of inspiraling mass distorts the BH_h, which results in a leading bulge, and such bulge then exerts a torque on the inspiraling idealized body; thus slowing inspiraling somewhat, for rapidly rotating BH.[608] So too for inspiraling mass for into alleged polar vortex (with extreme dragging of inertial frames) of herein considered BH_m? Thus might such inspiraling mass contribute a distinctive harmonic component to gravity waveform eminating from such extremely curved distorted spacetime polar vortex structure? Might previously mentioned outward rotating g.w.s (carrying off angular momentum), associated with polar jet, also have an effect (i.e. signal modulation) on such detected gravity waveform and harmonic components from polar vortex and associated inspiraling mass? Thus might the detected gravity waveform (and/or component harmonics) signal be a composite of both polar jet and polar vortex effects? Perhaps one might also consider a NS (neutron star) analogy of rapidly rotating fluids and associated g.w. production, and the carrying off of angular momentum, and compare it to the herein BH_m with polar vortex and polar jet scenario. Analysis and simulations suggest that rapid rotating NS can have rapid fluid rotation (r-modes) that give rise to g.w. generation; and wherein such generated g.w.s in turn positively contribute to further increase in amplitude of r-modes.[610] Such run away resultant effect is then conjectured to result in newly formed NS

to have a slower spin rate, secondary to the carrying off of angular momentum by g.w.s.[610] Might other compact objects, such as herein (modified) BH_m, have a slower rotation rate of BH_h, secondary to g.w.s carrying off angular momentum via a polar jet along axis of rotation (a_R) out of polar vortex? Also for extremes of high temperature (and low viscosity), and for extremes of rotation rate of inspiraling fluids for near to CE_{BHm}, then extreme {g.w.} creation and back reaction of $\{p_R\}$ creation etc., and also positive feedback of increased amplitude of fluid motions, would all contibute to extremes of more g.w. generation. Then, as suggested before, might such extreme g.w. creation contribute (mainly?) to the carrying off of angular momentum via a polar jet together with carrying off of angular momentum by neutrinos, and also by E-M radiation and charged quanta also via outward spiraling magnetic field lines of a polar jet? Some of angular momentum and energy might be re-distributed within (less than or equal to BH_h) of BH_m - see separate BHfig.gif file. Such a mechanism of extraction of rotation energy and angular momentum would seem much more prodigious, than any <u>just</u> external to BH_h mechanism. However such close to CE_{BHm} mechanism of rotation energy extraction would not exclude a concomitant external to BH_h mechanism. In regards to E-M radiation, at what depth and scale is rapid x-ray (and rapid gamma ray) variability of AGN, indicative? One has a resolution of some (depending on redshift) such jets of approximately 10^{15} cm (i.e. 10^{-3} lyrs, or approximately 8 lhrs, which would be on the approximate scale of our solar system).[49,363] However reservations about some such rapid variability have been expressed.[469] That is relativistic beaming near to, and along, the line of sight might give rise to variations that appear faster than they actually are.[469] More recently, variability of x-ray AGN sources of 100 secs, have been reported,[362] which would be less than the crossing time of a 10^8 M BH of Schwarzschild gravitational radius, $r_G = 10^{13}$ cm. Might perhaps a conceptualization of a polar jet (herein, for the BH_m model, the polar jet designation shall be considered often times as also referring to any

more centrally originating so-called beam of radiation and massive quanta) and polar vortex be indirectly inferred, or indirectly manifested in some way (such as via time variation in luminosity of radiation, or in the variation in polarization of synchrotron radiation emission, or in the variation of collective plasma emission, etc.)? The latter collective plasma emission has been proposed a a more efficient generator of higher power radiation for jets, and thus might better account for higher temperature brightness.[369] Such emissions might be distinguished from synchrotron radiation by rapid variability (and perhaps be a better explanation of very rapid x-ray radiation variation), and perhaps by high brightness temperature.[369] Also such collective plasma emission would probably require a path of a lower density of absorbing electrons, in order to be detected, and distinguished from synchrotron radiation.[369]

Might the central region of an alleged polar vortex (i.e. closer to a_R, and very deep in the alleged polar gravitational potential well) serve as a suitable path for egress of such collective plasma emission radiation, and thus also contribute to the extreme energy generation of an alleged polar jet? See the upcoming brief mention of neutrino wind models as possibly allowing for an avenue of egress along polar axis. In contrast, a jet model arising more directly from an accretion disk,[364] might perhaps be observed to have a periodic emission, secondary to the rotation of such jet source, and associated perturbations,[365] (in, or near to, an accretion disk, or as part of a magnetosphere), as the result of rotation of a jet about a BH. But aren't so-called narrow funnels in thick accretion disks supposed to be destroyed by non-axisymmetric instabilities?[364] More recently, very rapid periodic x-ray variability of a region of NGC 6814 Seyfert AGN, has been considered as consistent with rotation about a compact object;[366,367,380] part of an accretion disk, at < 15-20 r_G?[367] For the herein alleged polar jet model, in contrast, there would not seem to be any predicted rotation of a jet about a compact object, nor even precession about a_R; although might instrumentation eventually detect a 'hot spot' in a polar vortex, conjectured to perhaps have some detectable (?) very transient

rotational manifestation? Perhaps if there were such a jet(s) description for along (and in part outward spiraling about, a_R, such as for a plasma along magnetic field lines?), for respective hemispheres, perhaps might one also have, in part, some sort of an overall 'fountain-like' depiction (related to magnetic fields etc.?) for near to, and part of, such concomitant inward spiraling modified BH_h, as some such E-M radiation quanta, massive quanta, and plasma, part of a nascent jet, again merge into, and become part of, an alleged inward funneling towards CE of BH_m polar vortex description? As briefly allude too, perhaps even more rapid variability (milliseconds), corresponding to approximately 300 km,[382] or 10 km for 100 microsecs,[391] such as for Gamma Ray Bursts (GRB), if some are indicative of rapid variability near a central engine of AGN, might further elucidate the origin of beams, jets, and the herein alleged polar jet. For example, perhaps neutrino pair annihilation could give rise to gamma ray radiation that could escape via polar axis, wherein neutrino emission could also perhaps clear out a region along the axis of BH.[370] However a predicted thermal spectrum would seem to be in conflict with the observed non-thermal spectrum, as an explanation of GRB.[370] Also, for BATSE sensitivity up to 10^{10} ev, approximately 1000 GRB had been detected as of mid-1994 (increasing at about 1/day[382]), for perhaps redshift out to 1.5.[372] So then might GRB not be typical enough to account for AGN rapid source variability, even for the smaller subset of AGN we see along the beam-jet axis? The Gamma Ray Observatory (GRO) has detected 23 AGN as emitters of gamma rays, as of early 1993,[371] and 50 as 1995,[476] all of so-called blazer-like spectrum, which might be indicative of looking straight down into the throat (beam-jet?) of such AGN.[371] So even if GRB aren't frequent enough (as determined by GRO BATSE sensitivity of 10^{10} ev for the number of GRB detected so far, corresponding perhaps to a redshift out to about 1.5), to account for the frequency of looking down into, and along, the axis of AGN, still many observed AGN might have characteristic gamma ray rapid variability. 10^{12} ev (1TEV) gamma rays have been detected from Markarian 421, at z=.031, via atmosphere Cerenkov

radiation;[333] also now TEV gamma rays from Markarian 501 at z=.034.[476]

Such high energy (equivalent to temperature of 10^{16} K) gamma ray radiation, would not only seem consistent with pion annihilation and decay at 1.6 x 10^{12} K, but also with even nucleon annihilation (protons and anti-protons, and neutrons and anti-neutrons), and subsequent neutron decay, at 10^{13} K. Also even neutral current weak interactions at the source (90 GEV or 3 x 10^{15} K), and at least the 3 lowest alleged massive neutrino types, would seem consistent with such high energy radiation. Also not only high energy (1 TEV) gamma ray detection, but also high energy neutrino detection, of ever more sensitive neutrino telescopes, will likely eventually detect high energy long range electron, muon [and even tau?] respective neutrinos, and perhaps even rapid variability in their flux, from such sources,[390,492] - such as from, 3C273, 3C279, NGC4151,[374] and Markarian 421,[333] and now Markarian 501. Detection of very high energy neutrinos (TEV magnitude[476]) from AGN, such as muon neutrinos, would probably be by underground, or underwater, detectors of muons, resulting from muon neutrinos charge current interactions in the earth.[375,412] Also detection of very high energy source neutrinos via Cerenkov light from atmospheric neutrino-nucleon interactions, and subsequent hadronic showers, is another likely neutrino telescopic method.[375,412] Definitive detection of neutrinos from AGN would seem indicative of source hadronic interactions, such as involving pions; whereas high energy gamma rays could be indicative of either hadronic, and/or electromagnetic processes, such as electron acceleration for the latter.[375] Whereas GRO has just a 10^{10} ev upper limit senstivity to gamma ray detection, >TEV gamma ray detection is possible, for example, by utilization of atmospheric cascade particle showers together with photomultiplers.[333] More recently such TEV gamma rays from Markarian 421, 501, and their rapid variability, have been observed.[470,476] - see mentioned caveat on rapid variability for such relativistic near line of sight beaming.[469] One might even make the prediction that an alleged <u>next</u> more massive generation(s) of leptons (charged and neutral) might be inferred and detected eventually by

future neutrino telescopes monitoring emissions from AGN. Current, and planned, neutrino telescopes should be able to detect a diffuse neutrino background, which supposedly has it's largest contribution from AGN.[384] What part of such neutrino flux would be from electron neutrinos and anti-neutrinos from Big Bang, wherein the latter source is approximately the same order of magnitude as for CBR photons? At $>10^{19}$ TEV, the Auger project will supposedly pick up CMR - neutrino scatter.[492] The mass of the e^- is .5 MEV, and that of the μ^- is 105 MEV, 2 x 10^2 more massive; and the mass of the tau^-, at 1.784 GEV, is 17x greater than the mass of the muon. So for the herein argument, one might guess that the alleged next higher mass charged lepton (L_c) might have a mass of 10^2 times greater than the tauon's 1.784 x 10^9 ev; that is, a next generation L_c with a mass of say approximately 2 x 10^{11} ev rest mass. Then might a relativistic L_c or L_o (neutral lepton, i.e. neutrino associated with L_c) have an energy of perhaps $>10^{12}$-10^{18} ev? So might neutrino telescopes, sensitive for an energy scale up to 10^{12}-10^{20} ev (10^{15} ev =1 PEV)[412], perhaps detect, in addition to gamma ray effects and alleged lower mass neutrinos, also alleged higher mass relativistic neutrinos (L_o) from AGN? Might atmospheric and earth interaction detectors be able to sort out source electron, muon, and tau, neutrinos, and gamma rays (via a lack of muon poor atmospheric interactions, for the latter assumed source gamma rays?) from an alleged next more massive generation neutrino?

Incidently, more recently a robust method of determination of neutrino(s) mass is allegedly determinable via time delay for such different massive neutrinos from a supernova.[514] Also the sum of neutrino(s) mass should allegedly be less than 100 ev so as to avoid over closure of universe.[514] Herein, allegedly there are just BB derived L & R e^- neutrinos and L & R e^- antineutrinos for current cosmic background DM of alleged massive neutrinos. So if just 4 effective number of such species of background DM e^- neutrinos, then one would seem to have an upper limit of 25 ev for the mass of such e^- neutrino. The currently accepted 3 lepton generations, is based upon the decay channels of the Z , with mass of 90 GEV (10^{11} ev). However,

since the tauon charged lepton has a mass of 1.784 GEV, the next alleged more massive L_c might have a mass perhaps(?) $>10^2$ more (as mentioned above) than that of the tauon; giving L_c rest mass of 10^{11} ev, and a much greater relativistic energy, for in an AGN environment. Any associated L_o of such L_c would also have a similar relativistic energy scale, say of $>10^{12}$ ev. So the best (and most cost effective) place to look for evidence of a higher number of generations of leptons, might be those awesome accelerators in the sky, AGN, vis a vis neutrino telescopes.[412,512] See such references, 412, 512, for a detailed analysis of the promise, and problems, of neutrino astronomy. As mentioned before, might the herein alleged polar vortex and associated polar jet, and the resultant alleged extreme graviational well extending down to near CE_{BH}, seem consistent with copious p_R creation and annihilation (for $\{p_R\}$->n, for n extremely large for the extreme finer scale of down to near Planck scale (equivalent to energy scale of 10^{32} K), and for down to near CE_{BH} such a scenario)? So also should QCD processes, such as in the spirit of reference 379, be more seriously considered? Also might extremely intense radiation (inclusive of x-ray and gamma ray) generation, neutrino generation, and extremely intense gravity wave generation - all contribute energy to an alleged polar jet, and manifested in part perhaps as rapid x-ray and gamma ray variability, high energy neutrino generation processes such as pion decay (and also neutrino pair annihilation,[370] with residual excess neutrino and gamma ray emission?), and also rapid neutrino flux variability detection, in principle for all species, if high enough kinetic energy were maintained, since allegedly herein, there is no decay of higher energy excess neutrinos), and also manifested as plasma generation, extreme magnetic fields, and extreme (micro-second) gravity wave variability? So might future telescopes, sensitive enough to g.w.s and more sensitive to neutrinos,[391] and to there rapid flux variation, also observe so-called blazars i.e. looking directly down into the central engine of AGN? So eventually might one have all sky surveys of neutrino bursts, and of gravitational bursts, in analogy to all sky GRB bursts, wherein some (most?) of such perhaps

cosmological distant sources might be from herein alleged polar vortex and beam-jet of face-on observed AGNs? So perhaps externally observed jets arise from an extremely deep gravitational potential well along (and about) a_R of an alleged polar vortex of indented BH_h, and of an associated ergosphere (and also for external to such ergosphere construct), down to near to CE_{BHm}. That is, as earlier described, and as depicted in a previous appendix figures 1, and as mentioned in the above paragraphs, perhaps the polar vortex for an ergosphere,[51] and for modified BH_h, have an inwardly spiraling vortex description down towards, and near to, CE of BH_m.

The resultant relativistic inward spiraling $\{p_R\}$ plasma (?), and associated magnetic field, and funneling inward of angular momentum via inward spiraling neutrinos, and even of g.w.s, with increasing KE_L of p_Rs, and increasing g.w. energy, and also magnetic field energy, of increasing angular velocity (v_t/r), could then seemingly give rise to extremely high intensity radiation, and massive $\{p_R\}$, and then relativistic ionized gas (i.e. plasma), and neutrinos, and g.w.s. Might such intense radiation, neutrinos, and relativistic ionized $\{p_R\}$, perhaps then propagate outward about a_R (also outward spiraling, for both plasma along twisted magnetic field lines, and also perhaps the carrying off of angular momentum by neutrinos and even by g.w.s); hence contributing to the dispersal of magnetic field energy, and of rotational energy and angular momentum, such as from an internal accretion disk and from an alleged off equatorial re-distribution of energy for $<BH_h$? Variations in synchrotron radiation, would seem to be indicative of MHD. For near to CE of BH_m, might generated radiation, $\{photon_R\}$, and other massive $\{p_R\}$, and ionized gas, g.w.s, always be considered as 'outside' of modified BH_h? In this appendix, the mod BH_h construct is considered as possibly no longer being descriptive for near to CE_{BHm}. So the alleged extremely deep potential well, of alleged polar vortices, would allegedly give rise to an increase in KE_L of relativistic $\{p_R\}$, and to relativistic ionized gas, and to an

increase in intensity of $\{photon_R\}$, some of which in turn might remain descriptive for outside of modified BH_h (for along a_R, and for about a_R, in respective polar vortices), until such BH_h construct allegedly no longer is descriptive for down to near CE of Bh_m. Hence a BH_m model of not only a polar indented modified ergosphere, but also of a modified BH_h (and hence inclusive of the funneling of $\{p_R\}$ external to BH_h), down to near CE of BH_m of BH_m, as well as a continuation of an inward spiraling of an accretion disk, and of off equatorial re-distribution of energy, for $<BH_h$, would seem consistent with a maximizing of the intensity of radiation (such as of x-rays and gamma rays), and a maximizing of KE_L of relativistic $\{p_R\}$, inclusive of neutrinos, ionized plasma, and even of g.w.s, escaping in the form of a polar jet along (and about, as for outward spiraling plasma and magnetic field lines, and even for carrying off of further angular momentum by neutrinos and g.w.s?) a_R. Such neutrinos and g.w.s, outwardly spiraling about a_R, would carry off angular momemtum, even though they would be unaffected by collimating magnetic field lines. So PE_L conversion to KE_L, magnetic field energy dispersal, rotational energy conversion or re-distribution, and the maximizing of radiation intensity, and of relativistic $\{p_R\}$, and of ionized gas, and neutrinos and g.w. contribution to energy and angular momentum re-distribution, would all seem consistent with a concept of not only an internal accretion disk, but also an internal off equatorial re-distribution of energy and angular momentum, as well as a polar vortex (i.e. indentation of both the modified ergosphere, and of the modified BH_h (and hence of $\{p_R\}$ etc. external to BH_h), down to near CE of BH_m, for inward spiraling about a_R), and of a resultant polar jet. Also, as previously mentioned, such a polar vortex description would seem to give an increased surface area of such BH_m, in comparison to a more conventional BH construct;
hence a greater entropy for such description of BH_m than for a conventional BH, and hence seemingly more consistent with an alleged

theme of an ongoing maximizing of MTCs, one of which is allegedly entropy, in comparison to alternative scenarios (for example, such as for a more conventional BH).Thus would such alleged polar vortex (for both hemispheres) down to near CE of BH_m, and associated polar jet, help reveal what the BH_m interior environment might be like, for not only along, and about, a_R, but especially for near to CE of BH_m? That is, might extremely intense radiation, $\{photon_R\}$, (and any variation in the luminosity or polarization of such radiation, such as for rapid x-ray variation),[368,505,506] and rapid gamma ray variability,[370,371,382,391] copious relativistic $\{p_R\}$ description, inclusive of neutrinos, and the ionized (plasma) and magnetic fields, of such beam-jets, and g.w.s, allegedly originating from deep in the potential well of an alleged polar vortex, be perhaps giving an indirect clearer description of the environment near to CE of BH_m? So might such alleged polar vortices for modified ergosphere, and for modified BH_h, and alleged associate polar jets, serve as a window, revealing what the extreme conditions for the interior BH_m environment, for near to CE of BH_m, and hence allegedly eventually down to nearer the Planck (C_p) scale (herein allegedly similar for all locations in V_R, V_{Rp}, for all stages, including r_m minimum stage for BC->BB - see monograph, Spiral Rotation Model (SRM), reference in astro-ph 9909195) might be like? Also for such BH_m model, since allegedly one has a polar vortex with egress of energy, angular momentum via polar jet from deep in such polar vortex, wherein allegedly the BH_h is no longer descriptive, then one would no longer have a trapped surface. Hence one of the conditions (some of others relate to energy condition, and to no closed time-like curves) for the singularity theorem[597] would no longer seem valid for such a BH_m description. Hence such BH_m with polar vortex and polar jet with egress of energy, would no longer seem consistent with a singularity (Sg) description. Such a scenario with no Sg description is consistent with SRM, wherein there is allegedly always a C_R description for all stages of ...V_{Rp}->V_R->V_{Rp}... . Hence in SRM there

are allegedly no incomplete geodesics, and hence no so-called end to time scenarios (i.e. no Sg). So then no so-called end to time scenarios, neither for $<<BH_h$, nor for Big Crunch, nor is there allegedly any beginning to time scenarios (i.e. no Sg at initiation of BB) in the MSM/SRM. Hence no necessity for a cosmic censor hypothesis, since no naked Sg construct, nor even Sg construct per se, is utilized in MSM/SRM. Recapitulating, for BH_m, for near the deepest extent of alleged polar vortex (and ultimate origin of alleged polar jet), one allegedly no longer has a BH_h description; also such extreme conditions of $\{p_R\}$->n and {g.w.}->n, for n extremely large, yet finite, allegedly reveal the near to C_p finer local scale for all stages of ...V_{Rp}->V_R->V_{Rp}..., inclusive of r_m minimum stage, wherein BC->BB, in SRM - see Fig.2 of SRM. So no theoretical Sg for at CE_{BHm}, in SRM. Also no tearing of C_R manifold for at CE_{BHm}, even for final BH evaporation.

This would be in contrast to superstring models, wherein the conceptual appearance of final BH evaporation is associated with a tearing of a curled up Calabi-Yau dimension (i.e. a change in topology), and formation of an alleged massless quantum.[551] Rather in SRM, final BH_m evaporation would allegedly be described as for near to CE_{BHm}, and as for near to C_p scale, wherein $\{p_R\}$->n, and (g.w.}->n. Thus a final blast of alleged extremely massive quanta (superhadrons - see SRM) and extremely intense extreme high frequency g.w.s, followed by an ambient C_R and p_R description. So in SRM, the C_R manifold remains invariant for all stages of ...V_{Rp}->V_R->V_{Rp}... ; this would be in distinct contrast to superstring (SS) models, wherein tearing (and transformation) of curled up manifolds (and even in principle for extended non-curled up manifold)[551] are an integral part of SS modeling. Is this then the ultimate origin of a beam - jet, and the so-called central engine of AGN and microquasar? Also an accretion disk (conventionally considered as just external), and associated ionized plasma, giving rise to a so-called magnetosphere of changing electric and magnetic fields, has been suggested as powering observed

jets of AGN.[49,282] Other mechanisms of jet creation and maintenance have been suggested.[363,467] The mechanism of maintenance of such jet alignment along a black holes rotation axis (a_R), has also been suggested,[49,282] although the source of such jets is unknown.[361] As mentioned, an alleged inward spiraling (not necessarily log spiraling) of bulk 3-volumes as part of a so-called polar vortex for < mod Bh_h, (and even for >BH_h i.e. inclusive of mod ergosphere, etc.), and even its continuation downwards towards, and near to, CE of BH_m, might seem possibly consistent with such observed jets, and inferred beam. However, there is a vast literature devoted to inumerable different models for jets associated with AGN (wherein the latter supposedly likely have a BH central engine), and wherein such jets usually are considered associated with an external accretion disk (extending outward from perhaps 3 light minutes to 2 light months?).[334,363] More recently, an observation of the disappearance of the most inner aspect of an accretion disk of a BH (part of a binary stellar GRS 1915+105), associated temporally with infrared jet flares, would seem consistent with an accretion disk and jet functional association.[491,495,517] Thus such temporal association would seem consistent with an external accretion disk and a directly activated jet. However, such observation would also seem consistent with the disappearance of mass of inner accretion disk into BH, as part of an alleged internal accretion disk for <BH_h, and subsequent outwardly propagation via alleged polar beam-jet out of polar vortex of a herein alleged BH_m. Further resolution of site of origination of flares (i.e. >BH_h diameter vs rotation axis of BH_m) via infrared, or any associated radio interferometry,[503,504] observation would seem forthcoming. Recently sub-millimeter observations have probed closer to the base of such jet for GRS 1915+105, perhaps as close as 1 light minute from the base of such jet.[550] Also it has been suggested that x-ray iron line emission characteristics might distinguish between an accretion disk origin vs a bi-polar outflow source of a BH.[530] However no Doppler shifted emission lines have yet to be observed for micro-QSOs, even though occasional relativistic bi-polar jets from micro-QSOs have been noted.[530] AGN x-ray flare

rapid variability (<100s.), and time delayed iron line emission reflection (i.e. reverberation) might delineate the geometry near source, as well as information about the mass, spin of BH, and of accretion disk geometry;[505,506,531] now 10^{-3} s variability of x-ray flares.[527] Likewise then might higher latitude, or at base of jet,[505,506] off axis x-ray flare,[553] and associated reverberation (reflection) off bulk motion $\{p_R\}$ surface for just somewhat $>BH_h$, help to detect an alleged polar vortex, and associated beam-jet, allegedly emanating from such BH_m polar vortex? As mentioned, perhaps finer x-ray resolution of any x-ray flare source and associated (but time delayed) fluorescent x-ray iron line emission reflection (reverberation)[552] off inward spiraling bulk motion $\{p_R\}$ for near to, and towards, an alleged polar vortex of BH_m at perhaps 30 degree line of sight angle to a BH jet (or 60 degree inclination angle of observer),[553] for a so-called microquasar, might allow for observation (and geometry information) near to the alleged base of such jet (and near polar vortex, but just outside of BH_h?), allegedly eminating out of a polar vortex in herein BH_m model. More specifically, might a large blueshifted component of a broaden iron line x-ray fluorescent emission be detected, indicative of reflection off of jet, as suggested for AGN?[552] Also if the x-ray flare source were near to, or in proximal part of BH_m jet, and if the x-ray iron line reflection were closer to BH_h, for inward spiraling bulk $\{p_R\}$ for near to alleged polar vortex, or even within (closer to rotation axis) such polar vortex, might then one have a delayed redward shifted energy bump of such broaden iron line profile and intensity? This is all based on a discussion of such x-ray reverberation for AGN, wherein the geometry of accretion disk describes the solid angle see by x-ray source, inclination angle of surface to observer, and seen to depth of .1-1%.[552] Probably more so than for accretion disk, it might seem that any iron line emission reverberation from just outside surface (BH_h) of alleged polar vortex would be very broad secondary to relativistic velocity, gravitation redshift, Doppler shift (depending on rotation sense of bulk $\{p_R\}$, and turbulence (?). For such alleged inward spiraling bulk $\{p_R\}$

for just somewhat $>BH_h$ polar vortex, there would then be no concept of a last stable orbit; so in principle x-ray reflection (iron line broadening) from inward bulk spiraling $\{p_R\}$ could convey information as to the geometry of such bulk motion of $\{p_R\}$ for just outside of such alleged polar vortex, which allegedly has an an emanating beam-jet along it's central rotation axis. Gravitaional lensing, for close in source can have a contribution to effective width (EW) of iron line emission, and more so for off rotation axis x-ray source.[553] Also in simulations, one has a greater broadening for a greater inclination angle of observer to reflective surface, and > EW for greater rotation rate of Kerr BH (maximum extremal rate has gravitational radius of $r_g=1.24$.).[553] So for herein alleged inward spiraling bulk $\{p_R\}$ for just above BH_h of alleged polar vortex of BH_m, for an off rotation axis (and close in) x-ray source, and for an inclination angle of reflective surface (inward spiraling bulk $\{p_R\}$ for just somewhat $>BH_h$ of polar vortex) to observer of perhaps 60 degrees, might then the geometry of reflective surface of near to such alleged polar vortex be inferred? In fact, the BH_m model would predict that any very accurate determination of such jet's origination would be located to a < BH diameter, and even to a < BH radius; that is, for BH_m, allegedly such polar beam-jet would be resolved to an origination at the rotation axis of such Bh_m.

One might also mention a reference, wherein conjectured vortices, supposedly arising in an accretion disk, could give rise to collimated radiation that might then tend to funnel out along axis of the vortex.[339,364,380] Might such a latter model, involving axial velocity, angular velocity, and magnetohydrodynamics (MHD) etc., be modified and adapted to a herein described polar vortex, and associated polar jet model? Also jets have been described associated with proto-stellar formation, and with pulsars, wherein magnetic fields may (or are) involved, respectively, with the funneling of matter.[360,467] Might somewhat of an analogy to such models be applicable to an alleged polar vortex, in the BH_m model herein discussed? Also, it might be

mentioned, that some such downward and inward spiraling (as part of polar vortex) energy (i.e. $\{p_R\}$, radiation, etc.) might be redistributed, as part of a bulk 3-volume motion, to an upward and outward spiraling in the interior of BH_m, and transiently at, the modified BH_h, and then back towards polar vortex and CE_{BHm}, but from the inner side of BH_h of vortex; thus giving rise to the previous described alleged bulk idealized 3-volume motion modified circulation. Also some such energy of $\{p_R\}$, as part of inward spiraling polar vortex, might perhaps be redistributed into the <u>other</u> hemisphere's bulk modified circulation (with the same sense of rotation), and/or contribute to a jet of $\{p_R\}$ (approximate parallel to a_R, or with outward spiraling, as part of a polar jet), giving rise to an ionized gas i.e. plasma etc., but for the other hemisphere. So there could be an interchange of energy between the respective hemispheres' alleged modified global circulations and jets, respectively. In addition, it should be reiterated that such alleged idealized bulk motion redistribution of energy, $\{p_R\}$, also would seem inclusive, in part, of {g.w.}, especially for near to CE of BH_m, which would seem consistent with a description of considerable interactions of $\{p_R\}$, and of extreme turbulence of $\{p_R\}$, and of considerable {g.w.} generation, and back-reaction-like descriptions, especially for near to, <u>and even at</u> (herein there is always considered to be a spacetime description for <u>all</u> locations in V_R, V_{Rp}, and for all stages, for $>C_p$ scale), the <u>CE of</u> BH_m. Such alleged turbulence (denoted in fig 1 of appendix by a central dotted pattern) would seem consistent with a possible redistribution of energy into the other hemisphere's idealized modified bulk circulation, and into the other hemisphere's jet, likewise originating along a_R, concomitant to continuing inward and downward spiraling energy, $\{p_R\}$, of the southern hemisphere's polar vortex. Also, as mentioned above, allegedly herein there is <u>considered to always</u> be a p_R scale description, concomitant to a p_v scale description, even for near to, <u>and at</u>, the CE of BH_m. Hence always allegedly a corresponding associate C_R description for such p_R down to near CE of

BH_m, and even at CE of BH_m in such a description. However, the persistence of C_R description for near to, and even at, the CE of BH_m, would not necessarily imply always a conceptionally recognizable (describable) modified BH_h construct, for near to CE of BH_m of alleged respective polar vortices of modified BH_h. That is, for near to, and at, the CE of BH_m, {g.w.} would likely be of such extreme intensity, and $\{p_R\}$ generation (with p_R ->n, for n herein considered extremely large, but yet finite) and back-reaction, would be so extreme that a conceptional modified BH_h would no longer seem descriptive i.e. the > modified BH_h and < modified BH_h constructs, for modified BH_h of polar vortex, for near to CE of BH_m, would seem conceptionally non-descriptive (i.e. conceptually non-decernible). So the BH_h construct would then seem less essential for an entropy description in such a modified description for deep in an alleged polar vortex. Also as previously described, the modified $M^2{}_m$ of BH_h would then no longer seem unbounded; thus such BH_h would then no longer be modified closed, and thus the BH_m would also then no longer be modified unbounded nor modified closed, in such a description. For example, if one no longer had a modified BH_h description, then the conceptualization of an interior versus exterior would no longer apply to such a modified BH_h construct, for such alleged extreme conditions for such a location. So, as mentioned, such a modified $M^3{}_m$ of BH_m would then no longer seem to have a modified closedness. This then would be consistent with such BH_m allegedly having the same mod topology as for $V^3{}_L$ (the latter is allegedly also finite and bounded, and thus not closed) with respect to $V_R=\{V^3{}_L\}$. The local (for all scales), and also mod global, alleged respective invariances of mod topology for all stages, is herein one of the major overall themes. As mentioned, allegedly one would still have a corresponding C_R and $\{p_R\}$ description for near to, and even at, the CE of BH_m. Such an alleged breakdown of the modified BH_h construct, for near to CE of BH_m,

would seem consistent also with the alleged extreme turbulence of $\{p_R\}$ interactions, and likewise for {g.w.} generation and interactions, for near to, and at, the CE of BH_m, and with the possible partial redistribution of $\{p_R\}$, etc. (i.e. of energy), into the other hemisphere's idealized modified bulk global circulation, and perhaps partially into the other hemisphere's polar jet; the latter allegedly also originating approximately along a_R, and arising out of the southern hemisphere's polar vortex. Also such alleged egress of quanta and g.w.s, plasma, magnetic field lines, via alleged polar beam-jet would then allegedly be associated with new $deltaI_2 = -deltas_2$, and concomitant alleged $deltas_1 = -deltaI_1$ generation; hence the so-called 'interior' region of BH_m would seem to be a source of new information and entropy generation, which could allegedly escape from BH_m via such polar beam-jet. Hence the essentially one-wayness (for example, with regard to infalling quanta and g.w.s, and their associated information; and ignoring BH evaporation) of a conventional BH_h model would then no longer seem consistent with the above scenario. Summarizing, in regards to angular momemtum conservation: one might have overall angular momentum conservation in an overall scenario from inward spiraling of an external accretion disk through BH_h, and continued for an alleged internal inward spiraling accretion disk down towards the CE_{BHm}. And from such internal accretion disk, and especially for nearer to CE_{BHm}, one might have off equatorial plane outward and upward spiraling of matter, energy, as described for convenient idealized bulk 3-volumes, transiently to the mod BH_h, and then subsequent inward and downward spiraling for polar vortex towards CE_{BHm} - see appendix Figure 1. Then, in part, one might have outward spiraling about a_R, along the polar axis, for plasma in upward spiraling magnetic field lines (MHD). Also neutrinos (although neutral) and g.w.s might contribute to a carrying off of angular momentum, deep within an extremely high energy region of an alleged polar vortex - thus contributing to an alleged deeply originating outward polar jet.

So would such an overall scenario, from internal accretion disk to polar beam jet, seem consistent with conservation of angular momentum, even for <Bh_h ? Another avenue of further exploration might be that of the relationship of jet formation with singularity dynamics, wherein one can describe so-called curvature collapse and associated jet formation in hydrodynamic models.[536,537] So analogously for BH_m polar vortex, might the extremes (exponential?) of gravitational P.E., angular momentum, radial collapse, and K.E., all give rise to a hadron mass spectrum ->n, a very large but finite number, and to extremes of curvature and extremely rapidly curvature changing in frequency and amplitude i.e. {g.w.} ->n, a very large but finite number, and with associated extremes of back reaction of $\{p_R\}$ creation - all associated with a beam-jet creation emanating from such alleged BH_m polar vortex? Elaborating more about jets, in more conventional models, jets, associated with QSOs, blazers, and other AGNs, and perhaps even with all (?) galaxies at some stage, or perhaps for all (?) stages, are modeled as arising from external accretion disks. A suggested universal model, perhaps common to proto-stellar formation, as well as for compact objects (BH etc.), has an associated transfer of angular momentum from an accretion disk to a jet.[467] In jet models, the central body (for example, compact object) per se would supposedly serve only as a gravitational well.[467] Magnetic fields, originating in such an external accretion disk, would then lead to collimation of charged quanta and asssociated radiation into polar jets.[467] However, for most QSOs, there does not seem to be sufficient gas accreting onto a central BH, in the form of gas in the parent galaxy, or from interacting galaxies.[468] In contrast, as described earlier, for a BH_m, a beam jet would allegedly arise from deep within a polar vortex of such BH_m, wherein the BH_h construct eventually would allegedly no longer be descriptive for near to CE_{BHm}. In such a BH_m model, the absence of colliding galaxies and/or of large enough accereting gas mass to a central compact object in QSOs, would not allegedly affect the beam-jet of BH_m, since such jet allegedly arises from deep within an alleged polar vortex of BH_m,

wherein extremes of energy are allegedly always descriptive. An alleged internal to BH_m (i.e. $<BH_h$ for off polar axis) bulk mod circulation of mass and radiation, associated with magnetic fields, and even inclusive also of g.w.s and neutrinos due to their carrying off of angular momentum, would also allegedly contribute to such extremes of energy down near to CE_{BHm}, wherein the BH_h construct allegedly would no longer be descriptive - see Appendix Fig.1, and separate file, BHfig.gif. So in such BH_m model, an extension of an external accretion disk construct, but in a modified manner (for less than or equal to BH_h) for a so-called internal accretion disk, associated with magnetic fields, and throwing off of mass, energy, and ever more tightly wound magnetic field lines, as well as also including g.w.s and neutrinos, would allow for a reduction in angular momentum of mass in the remaining inward spiraling mass of such internal accretion disk. Such a scenario of an internal accretion disk, an off disk re-distribution of mass, energy, and angular momentum, would seem compatible with an external accretion disk, and the re-distribution of mass, energy, magnetic fields, and of angular momentum, from such external disk. So perhaps might even both an external accretion disk, and internal accretion disk (via so-called bulk mod circulation off of such internal accretion disk) throw off mass, energy, magnetic field lines, and angular momentum - thus both contributing to a jet description, but a greater proportion from an internal accretion disk, since one would seem to likely have much higher energy interactions for $<BH_h$ for nearer to CE_{BHm}? As mentioned, the absence of sufficient fuel (for a QSO central BH and associated jet formation) in the form of colliding galaxies, and/or of large gas infall,[468] might seem to de-emphasize the role of an external accretion disk in the formation and maintance of a jet description. Also if galaxy jets arose only from an external accretion disk, then essentially negligible g.w. generation would seem to be expected, and also essentially one would then have no contribution of neutrinos to the carrying off of mass, energy, angular momentum, although g.w.s and neutrinos would not be confined by such observed jets. In contrast, in a BH_m model, with an alleged polar vortex, and

associated beam jet, originating very deep in the gravitational well (wherein one has extremes of energy description) of such BH_m, then also copious g.w. generation would, in part, also seem to outwardly propagate from such polar vortex (but not confined by magnetic fields, as for collimated jet). As a result of such hypothesized g.w. generation deep in a polar vortex (with an inwardly spiraling mod BH_h description down to near to CE_{BHm}), might such created g.w.s (that is, those that escape from BH_m via polar vortex), then perhaps be imprinted with an outward propagating angular momentum? So then would g.w.s contribute to the re-distribution of angular momemtum? Might one then consider that such outward propagating g.w.s (from deep within an alleged polar vortex of BH_m) have a torsion description (just short range, or also long range?[472])? Torsion per se is not part of a GRT description.[578,595,599] However a torsion description, for outward propagating g.w.s, would not seem in contradiction to experimental evidence (as of approximately 1972) in support of GRT.[3] But neither has there been any observational results supportive of a torsion model (for example, Einstein-Cartan spacetime) of gravitation.[599] A torsion description is part of Einstein-Cartan spacetime model, which differs from GRT.[588,599] A gravitation model with torsion would violate Einstein Equivalence Principle (EEP), wherein the latter is observationally accurate to 10^{-14}, based on weak field, and strong field (binary quasars), results.[599] In appendix of monograph Spiral Rotation Model, for an alleged polar vortex description, with alleged outward spiraling, one could still seemingly have such an outward twisting motion, with change in angular momentum i.e. torque (T=deltaL=Idelta), and change in torque (deltaT=deltadeltaL=Ideltadelta), but without a torsion gravitation model (like Einstein-Cartan model) per se. Rather just extreme curvature, and extremely rapidly changing curvature could give such outward twisting motion for g.w.s and for electron neutrinos, and other quanta. So just retention of the curvature tensor, without any shear distortion of shape of g.w. waveform and of spacetime, might suffice, even for such alleged polar jet outward twisting paths of g.w.s and of

electron neutrino and antineutrino, and other quanta, which supposedly are carrying off angular momentum of mass and energy, which in part previously inwardly spiraled through BH_h, and also inwardly spiraled via alleged polar vortex, and towards CE_{BH}.

So might not only the alleged eventual detection of g.w.s (with a characteristic waveform) from a BH_m polar vortex (such as for blazers - looking down the throat towards the central engine), but also a circularity component (i.e. angular momentum) to such outward propagating g.w.s, be a <u>prediction</u> of such alleged polar vortex of a BH_m model, distinguishing clearly such model's beam jet formation from that of more conventional external accretion disk models of jet formation? That is, if jet formation for BHs were just from an external accretion disk, then would neither neutrinos nor g.w. generation seem so evident? Also as mentioned, alleged massive neutrinos might also carry off angular momentum, via component of polar beam jet about a_R, although such massive neutrinos (likewise for g.w.s) would <u>not</u> be confined by any collimating magnetic fields of such beam jet. And especially for nearer to, and at, CE_{BHm}, copious {g.w.} creation would seem likely, since allegedly such location, for $<BH_h$, would have a description similar to that near to the Planck scale (C_p). And for near to such C_p scale, one would have {g.w.} scattering and absorption.[471] Also in such central location for near to CE_{BHm}, the energy density of {g.w.} would allegedly be similar to that of $\{p_R\}$. Hence supposedly one would have an effect on (generation of) background curvature by the extremely high energy density of {g.w.}.[471] The stress energy tensor of g.w.s (T^{GW}) is averaged over several wavelengths for the gradient squared of the field.[471] At such extremes of energy, one would also have an extreme back reaction, with extreme {g.w.} generation giving rise to, and associated with, copious $\{p_R\}$ creation (for an alleged number, and number of generations, ->n, an extremely large, but yet finite number, for finite finer scale of just $>C_p$). Also the non-linearity of GRT, and for g.w. creation in such extreme energies, would seem to give rise to T^{GW}, in turn giving rise to further {g.w.}

creation. Also for such extreme energies, wherein the frequency of g.w.s is so extreme, then gravitational shock waves would seem realizable.[471] Might then such intense high energy {g.w.} give rise to reverberation thoughout $<BH_h$, in part ideally schematized as a so-called mod bulk circulation? Might one then also have resultant pulsations of BH_h, in analogy to heliosesmography? Thus might resultant rapid changes in the gravitaional field for $<BH_h$, have detectable effects, such as for angular momentum of external accretion disk? Also, as previously described, such copious g.w. creation could egress such BH_m via an alleged polar beam-jet from deep in polar vortex, since allegedly such BH_h no longer becomes descriptive for the extreme energy densities of such two alleged polar vortices (see reference of astro-ph 9909195 for another schematized depiction of such respective polar vortices). Also such alleged egress of g.w.s and p_R s via beam jet deep in polar vortex would have an associated description of new information ($deltaI_2 = -deltas_2$) creation, and alleged inevitable new entropy ($deltas_1 = -deltaI_1$) generation, with allegedly $deltas_1 > deltaI_2$, always. Thus the loss of information, from the conventional conceptual observer's perspective from $>BH_h$, would, from the $<BH_h$ conceptual observer's perspective, also have new information and entropy creation for $<BH_h$, inclusive of that new entropy and information associated with the alleged polar beam jet and of region inwards towards polar axis of polar vortex.

Looking down the throat of blazers of AGN and microquasars, how far down to an alleged central engine might we eventually be able to peer via telescopes (x-ray and sub-millimeter), and also with new neutrino and g.w. telescopes? Such immense massive cosmic accelerators in the sky, and microquasars, as mentioned, hopefully might allow us to, in principle at least, 'peer' right down close to the extreme conditions of $\{p_R\}$ and {g.w.} creation for near to C_p scale. Allegedly such an extreme scale of just $>C_p$ also characterizes the finer scale for all locations for throughout V_R and for all stages of $..V_{Rp} -> V_R -> V_{Rp} .. .$

Also as previously noted, herein there is considered to be no so-called Sg scale. Rather allegedly there is always a C_R and p_R scale description for all locations in V_R, V_{Rp}, and for all stages of ..V_{Rp}->V_R->V_{Rp}... So-called microquasars in our galaxy appear to be like a scaled down version of AGN in many aspects such as having a BH central engine, accretion disk, and relativistic jets.[495,491,517] So reiterating, how far down into the throat (i.e. looking down, or line of sight near to, the beam-jet of a microquasar, might we eventually be able to peer? As mentioned, more recently an observation of the disappearance of the most inner aspect of an accretion disk of a BH (part of a binary stellar GRS 1915+105 at 40,000 lyrs from us), associated temporally with infrared/radio jet flares, would seem consistent with an accretion disk and jet functional association.[491,495,517] Thus such temporal association would seem consistent with an external accretion disk and a directly activated jet. There are many models of jet origins.[539] However, such observation would also seem consistent with the disappearance of mass of inner aspect of an accretion disk into BH, as part of an alleged internal accretion disk for <BH_h, and subsequent outwardly propagation via alleged polar beam-jet of polar vortex of a herein alleged BH_m. Observations do not always show flare relativistic jets in association with disappearance of hard x-rays.[495,517] If jets arose directly from just an external accretion disk, then wouldn't it seem as if all observations of hard x-ray drop offs would be associated with IR flares? In contrast for inward spiraling of matter to <BH_h, with alleged subsequent polar vortex jet beam emanation, perhaps might a correlation sometimes be weaker? Further resolution of the site of origination of flares (i.e. >BH_h diameter vs any finer resolution) via infrared, or any associated radio interferometry, observations might be helpful. As mentioned, recently sub-millimeter observations have probed closer to the base of such jet for GRS 1915+105, perhaps as close as 1 light minute from the base of such jet.[550] Also perhaps finer x-ray resolution of an alleged continuous x-ray source, near to and at an alleged polar vortex of Bh_m of a so-called microquasar, might thus allow an observation near to the alleged base of such jet, allegedly

emanating out of a polar vortex in a BH_m model. In fact, BH_m model would predict that any very accurate determination of such jet's origination would be located to a < BH diameter, and even to a < BH radius; that is, for BH_m, allegedly such polar beam-jet would be resolved to an origination at the rotation axis of such BH_m - see references of astro-ph 9909195.

It has been suggested that iron line emission line characteristics might distinguish between an accretion disk origin vs a bi-polar outflow source of a BH.[530,531] However no Doppler shifted emission lines have yet to be observed for micro-QSOs, even though occasional relativistic bipolar jets from micro-QSOs have been noted (ref 530). More recently, another approach has been pursued, wherein there is considered to be no trapped surface resulting from a physical fluid's gravitational collapse, for non-zero mass.[629] Such supposed lack of a trapped surface would allegedly be consistent with GRT and with time-like world lines always remaining time-like (i.e. always propertime dtau>0).[629,630] Also if no trapped surface, then one of the assumptions of the Singularity Theorem would be invalid, thus negating such theorem.[629] In contrast, if there were a trapped surface for gravitational collapse of a physical fluid, then time-like worldlines would become null-like; hence then violating the Equivalence Principle.[629,630] Then the authors allege that a physical gravitationally collapsing radiating fluid (such as for a galactic BH candidate, GBHC) must obey a no trapped surface condition, in order to be consistent with the Equivalence Principle.[629,630] Thus supposedly no event horizon can form for mass M>0; rather the collapsing surface is red shifted to infinity.[629,630] But wouldn't collapsing stellar objects much too massive to form just a neutron star (NS), have to form a BH? The authors allege that such a massive object would not have an event horizon and thus would not result in a BH, but rather just an endlessly collapsing object, with collapsing surface redshifted to infinity.[629,630] How would one test such a model? Recent observational results could be intrepreted as if a NS, and by extapolation a GBHC, might have an intrinsic magnetic moment,[631,630] and that if such were the case, then an event horizon for

a GBHC would be inconsistent.[630] Garcia (cited in reference 630) alleges that the quiescent x-ray luminosity for a x-ray binary BH is evidence for energy flowing across an event horizon, even if there were no advective dominant accretion flow. Also a so-called exotic compact object, with a mass too great for a NS, but yet with no event horizon, and with perhaps a hard surface, has been entertained.[632] Alternatively, Leiter and Robertson allege that an intrinsic magnetic field is responsible for quiescent x-ray emissions; and x-ray emissions correlate with rotational energy loss.[631] And that such rotational energy loss results from 'magnetic torque on axial aligned rotating magnetic dipole.'[631] A so-called magnetosphere is capable of removing angular momentum from the inner portion of an accretion disk.[631] In contrast, if such GBHC is a conventional BH with an event horizon, then one could not have an intrinsic (internal) magnetic field.[631] The authors allege that magnetic fields need to be more internal than just from an accretion disk, and more persistent than just from an accreting Kerr-Neuman BH; and that greater magnetic field strength might be from the kinetic energy of jets and synchronton radiation of GBHC, such as GRS 1915+105.[631] How might all of this relate to the so-called modified BH_m model, as described in this summary of appendix of SRM? In the BH_m model one also no longer has a trapped surface, and hence one has negation of the Singularity Theorem. This would be consistent with the there always being a C_R scale for all locations in V_R and for all stages of ...V_{Rp}->V_R->V_{Rp}... .
In other words, geodesics never end, in such a SRM scenario, and as more specifically illuminated by the BH_m construct. Also as described for such BH_m, the BH_h (BH horizon) becomes no longer descriptive for deep within polar vortex. This is allegedly so since the energy scale becomes so extreme that one has extreme deformations of the manifold, C_R, which results in the indistinguishablity of an exterior vs interior of BH i.e. the BH_h (BH horizon) construct no longer is descriptive on such an extreme energy scale; hence no longer a trapped surface, and thus no longer a Singularity Theorem, for this particular

case, and generalized in the SRM, likewise so for all locations in V_R and for all stages, ...V_{Rp}->V_R->V_{Rp}... for U_T, and for the System, S={U_T}, an alleged divergent (aleph$_o$) succession of U_Ts. Hence consistent with the theme of the System being self-sufficient onto itself. So for BH_m construct, one allegedly has egress of quanta (inclusive also of neutrinos, and also inclusive of E-M radiation) and g.w.s via alleged bipolar outflow of jets out of so-called polar respective vortices. Such egress of g.w.s and quanta also carry off angular momentum about polar axis. So are Mitra, Leiter, and Robertson's studies and the SRM BH_m construct perhaps probing at a similar quandary? That is, the lack of a trapped surface, and hence no loner a Singularity Theorem. Also might the BH_m construct, with it's egress of quanta, g.w.s and carrying off of angular momentum via bipolar jets, seem consistent with the BH_m construct having an intrinsic magnetic moment; thus helping to explain the hard x-ray luminosity of the quiescent stage of an x-ray binary? For example, as mentioned, Leiter and Robertson allege that an intrinsic magnetic field is responsible for quiescent x-ray emissions; and x-ray emissions correlate with rotational energy loss.[631] And that such rotational energy loss results from 'magnetic torque on axial aligned rotating magnetic dipole.'[631] Might the latter magnetic dipole be related to the alleged beam-jet carrying off angular momentum (i.e. rotational component of kinetic energy), and arising from extremely deep in respective two polar vortices at such an extreme energy scale that there is intense deformations of C_R, consequently rendering the BH_h construct for such extreme finer scale no longer descriptive? Thus might one have one's cake and eat it too? That is, in the BH_m scenario, one still has formation of an event horizon, but not for at the respective origin of bipolar outflow at extremely finer scale of extreme deformations of C_R and of extremes of energy density. Hence such BH_m would be finite, bounded, and hence not closed; likewise so for $V^3{}_L$ member of {$V^3{}_L$}=V_R, as described in the SRM. So then one would have the same topological description and invariance for C_R for both inside and

outside such BH_m; this would be consistent with no Singularity construct for a BH interior nor for anywhere in V_R, nor for any stage of ...V_{Rp}->V_R->V_{Rp}.... Hence geodesics never end (i.e. C_R is always descriptive) allegedly for anywhere in $V^3{}_L$,or for any $V^3{}_L$ member of $\{V^3{}_L\}=V_R$, or for any stage of ...V_{Rp}->V_R->V_{Rp}..., member of so-called total universe, $U_T=\{\{V_R\}_p\}$ set of planes, for the divergent System, $S=\{U_T\}$, with $aleph_o$ cardinality.

ABBREVIATIONS

Vf_m local velocity of modified flow of idealized bulk 3-volume in BH_m.

f_m modified flow of idealized bulk 3-volume in BH_m.

V_m x Vf_m=$omega_m$ not equal to 0 modified 'global' vorticity (omega) of bulk 3-volume in its alleged overall spiral path (not necessarily log spiral) inward, and downward for respective polar vortices, and for subsequent 3-volume upward and outward (in northern hemisphere) spiraling from near to CE of BH_m.

C_m=sigma$_i$ Vf_mdelta s_i modified circulation for overall 'global' bulk motion of 3-volumes over a local 3-separation (delta s, wherein delta s has a finite finer scale) for BH_m.

V_m mod vector operator delta/delta x, delta/delta y, delta/delta z; but on a finite scale.

Omega$_L$=V_m x V conventional local vorticity.

Delta omega$_L$/delta t + V(vector operator) x (omega$_L$ x V)=0 conventional change in local vorticity.

$M^2{}_S$ finite, modified bounded mod 2-manifold of BH_h, and of the outer boundary of the modified ergosphere of BH_m.

$M^3{}_m$ finite, mod bounded, and hence not closed mod 3-manifold of BH_m.

CE_{BHm} center of energy of modified BH.

mod BH_h modified BH horizon.

< less than, or less than and equal to, depending on the context; for ex., <Bh_h usually refers to the latter.

> greater than, or greater than and equal to, depending on the context.

s_{BH} entropy associated with BH.

s_{BHm} entropy associated with mod BH_m.

MHD magnetohydrodynamics

r_G Schwarzschild gravitational radius

s.c. or sc: supercluster

C_R local pseudo-Remannian spacetime

$V_p=\{p_v\}$: physical vacuum consisting of a modified set of virtual quanta (virtual particles), $\{p_v\}$.

$V_{R:}$ regional volume, a spatial 3-volume, which has an approximate correspondent of the conventional 'universe'.

$U_T=\{V_R\}$: the so-called total universe, abbreviated as an array (mod set) of regional volumes.

CEu_T = CE of $\{V_R\}$: the conceptual mod center of energy for $U_T=\{V_R\}$.

$p_1=\{V_R\}$: one plane of $\{V_R\}$, symmetrically distributed about CEu_T.

$U_T=\{p_i\}$: total universe described as a mod spherically symmetrical distributed array of planes about CEu_T..

$U_T=\{\{V_R\}_p\}$: a more inclusive description of the total universe as an alleged spherical symmetrical distributed array (mod set) of mod planes, wherein each mod plane consists of a symmetrically distributed array of V_Rs. Sometimes just a shortened equivalent version, $U_T=\{V_R\}$, will be utilized.

CE_{sc}: center of energy for supercluster.

mod: modified version of a construct.

$\{CE_{sc}\}$: mod set of center of energies for respective superclusters.

$\{sc_i\}$ or $\{sc\}$: mod set of superclusters. Oftentimes $\{CE_{sc}\}$, or $\{sc_i\}$, or $\{sc\}$, notations will be utilized interchangeably to indicate just a mod set of s.c.s.

mod set: the elements of such mod set are frequently considered schematically as just <u>mod points</u>. All the conventional denotations and connotations of conventional mathematical sets and points are not herein implied. Hence the usage of the term, <u>mod</u> set and mod point.

$\{void_i\}$ or $\{void\}$: mod set of voids in 1 V_R.

$V_R=\{sc\}+\{void\}$: V_R defined as consisting as a mod set of s.c.s and of voids.

Cv_R: conceptual center of energy of V_R, wherein such CEv_R could be considered as a mod point. So too for CE_{sc}.

CE_{void}: center of energy for a void.

p_R real quantum (real particle).

p_v virtual quantum (virtual particle).

$\{p_R\}$: mod set of real quanta. Not meant to denote a singleton mod set. $\{p_R\}$ is frequently understood by the context to be referring to just fermions. But also bosons might be considered to be included.

S_{tm}: modified time-like separation. Such S_{Tm} is usually considered for 1 U_T (hence normalized); and is not meant to denote any GRT time-like 4-separation.

CEv_{Rp} : CE for $V_{Rp.}$

GRT General Relativity Theory.

SR Special Relativity Theory.

Byrs billion earth years.

CBR cosmic background radiation of real photons.

Vv_R mod global velocity of $CEv_{R.}$

Vv_{Rp} mod global velocity of CE for V_{Rp}.

v_{sc} mod global velocity of CE_{sc}, but locally observed, and denoted, in units of kilometers/sec (kms^{-1}).

V_{void} : mod global velocity of CE_{void}; locally observable as the alleged mod large scale streaming of galaxies, and of infrared objects, and perhaps of Lyman alpha clouds in the voids.

v_m Majorana neutrino.

v_D Dirac neutrino.

v_e electron neutrino.

v_u muon neutrino.

L_o and neutral anti-$leptons_o$: neutral leptons (i.e. neutrinos and antineutrinos for all species).

L_c and charged anti-$leptons_c$: charged leptons and anti-leptons for all species.

BB: conventional Big Bang, in a general sense.

BC: big crunch towards minimum volume recollapse

Blyrs billion light years.

V_{Rp} : precursor/postcursor regional volume. The former refers to the early evolutionary stages of spatial 3-volume, and the latter refers to late evolutionary stages of spatial 3-volume, for a recontraction scenario.

HDM: hot dark matter (i.e. electron neutrino and e^- anti neutrino).

v_r, v_t : are the radial and transverse component mod velocities of Vv_R, and of velocity Vv_{Rp}: the velocity of V_{Rp}; $Vv_R = v_t + v_r$.

M_m modified manifold, a general notation. $M^2{}_R$, $M^2{}_G$, $M^2{}_L$, $M^3{}_R$, or $M^3{}_L$, would be examples of more specific notations.

$M^4{}_L$ for a local C_R mod topology.

V_R or V_R regional spatial 3-volume; $V_R\{V_L{}^3\}$.

$V^3{}_L$ local spatial 3-volume.

C_p Planck scale modified continuum.

$M^3{}_R$ mod topology of V_R. The $M^3{}_R$ denotes (and emphasizes) that $M^3{}_R$ does <u>not</u> have a mathematical s^3 topology.

$M^3{}_L$ mod topology of local spatial 3-volume $V^3{}_L$, wherein $M^3{}_L$ does <u>not</u> have a math s^3 topology; hence $M^3{}_L$ is <u>not</u> mod <u>un</u>bounded, and hence is considered as <u>not</u> mod closed. Hence with respect to the isotropy of CBR, there would allegedly be no recontraction of such $\{_R\}$ for over one $V^3{}_L$.

log spiral: logarithmic spiral.

Sg: conventional singularity, a mathematical extrapolation wherein energy -> infinity, curvature diverges, and volume->infinitesimal, or essentially zero.

MTC mod time construct

$->O_+$ denotes a positive definite value.

$S=\{U_T\}$, the System, consisting of divergent (cardinality of intergers) sucession of so-called total universes.

$S_{Tm}->0_+$ denotes a mod instant (i.e. an evolutionary mod point) of positive definiteness. Likewise for all other MTCs..

E^1 Euclidean line.

L^1 Lobachevskian (hyperbolic) line.

E^2 Euclidean plane.

L^2 Lobachevskian (hyperbolic) plane.

2-D: two dimensional.

1-D: one demensional.

mod point: mod positive definite finest p_R scale, as for residing in $V^3{}_L$ member of $V_R=\{V^3{}_L\}$, or for in $V^3{}_L$ member of $\{V_{Rp}\}$. Also mod positive definite mod instant (i.e. evolutionary mod point) S_{Tm}->O_+, on corresponding finest P_R scale, for mod global motion of CEv_R, CE_{sc}.

R^1 real number line continuum.

R denotes real numbers.

phi: mod azmithal angle delineated by CEu_T to CEv_R position vector sweeping out the log spiral mod global path of CEv_R, and concomitantly of all of its constituents. Conventionally, phi will be considered as counter clockwise in angular displacement, as if viewed conceptually from the perspective of looking down upon a plane of V_Rs (i.e. $p_1=\{V_R\}$, for p_1 member of $\{p_i\}=U_T$.

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