

Corrigendum

Corrigendum: Spontaneous scalarisation of charged black holes: coupling dependence and dynamical features (2019 *Class. Quantum Grav.* 36 134002)

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Received 20 August 2019, revised 12 December 2019

Accepted for publication 7 January 2020

Published 22 January 2020



CrossMark

In this corrigendum we perform some small notations corrections and correct some equations, as well as to clarify a solutions behavior, to [1].

1. Page 8—At the end, instead of $\delta\phi(r, \theta, \phi) = \sum_{\ell m} Y_{\ell m}(\theta, \phi) U_{\ell}(r)$, it should be $\delta\phi(r, \theta, \varphi) = \sum_{\ell m} Y_{\ell m}(\theta, \varphi) U_{\ell}(r)$.
2. Page 9—Equation (3.3) should read

$$U(r) = P_u \left[1 + \frac{2Q_e^2 (r - r_H)}{r (r_H^2 - Q_e^2)} \right], \quad \text{where} \quad u \equiv \frac{1}{2}(\sqrt{4\alpha + 1} - 1).$$

3. Page 11—Before the perturbative stability section, where is $\alpha \in [-1/4, -1.89074]$ there should be $\alpha \in [-1.89074, -1/4]$.
4. Page 11—Equation (3.5), instead of $\phi = \phi(r, t)$, it should be $\phi = \tilde{\phi}(r, t)$
5. Page 11—Equation (3.7), instead of $V_1 = -V' \left[\delta_1 + \phi_1 \dot{f}_i(\phi) \right]$, it should be

$$V_1' = -V' \left[\delta_1 + \phi_1 \frac{\dot{f}_i(\phi)}{f_i(\phi)} \right].$$

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6. Page 11—Equation (3.9) should read

$$\frac{dx}{dr} = \frac{1}{e^{-\delta N}}.$$

7. Page 11—Equation (3.10) should be

$$U_{\Omega} \equiv \frac{e^{-2\delta N}}{r^2} \left\{ 1 - N - 2r^2 \phi'^2 - \frac{Q_e^2}{2r^2} \left[\frac{2}{f_i(\phi)} (1 - 2r^2 \phi'^2) - \frac{2\dot{f}_i^2(\phi)}{f_i^3(\phi)} + \frac{1}{f_i^2(\phi)} (\ddot{f}_i(\phi) + 4r\phi' \dot{f}_i(\phi)) \right] \right\}.$$

8. Page 12—Caption of figure 4 should be: ‘Effective potential, U_{Ω} , for a sequence of solution with the exponential coupling, $\alpha = -10$ and $Q_e = 0.12$. The solutions have $r_H = 0.32$ ($q = 0.658$)—lowest curve—up to $r_H = 0.308$ ($q = 0.676$)—top curve. The curve in red corresponds to the f_E solution in figure 1 (top left panel) with $r_H = 0.318$ ($q = 0.66$)’.
9. Page 12—In the last paragraph of section 3, the sentence ‘For the fractional coupling, on the other hand, there can be negative regions in the potential both for physical and exotic solutions.’ should be appear immediately before the sentence ‘We emphasise that the existence of a negative potential region is a necessary, but not sufficient, condition for instability’.

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Reference

- [1] Fernandes P G, Herdeiro C A, Pombo A M, Radu E and Sanchis-Gual N 2019 Spontaneous scalarisation of charged black holes: coupling dependence and dynamical features *Class. Quantum Grav.* **36** 134002