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EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider

Villa Bighi, Malta, 14 - 16 Oct 2010

Proceedings - CERN Yellow Report CERN-2011-003

editor: E. Todesco and F. Zimmermann

This report contains the proceedings of the EuCARD-AccNet-EuroLumi Workshop on a High-Energy Large Hadron Collider 'HE-LHC10' which was held on Malta from 14 to 16 October 2010. This is the first workshop where the possibility of building a 33 TeV centre-of-mass energy proton--proton accelerator in the LHC tunnel is discussed. The key element of such a machine will be the 20 T magnets needed to bend the particle beams: therefore much space was given to discussions about magnet technologies for high fields. The workshop also discussed possible parameter sets, issues related to beam dynamics and synchrotron radiation handling, and the need for new injectors, possibly with 1 TeV energy. The workshop searched for synergies with other projects and studies around the world facing similar challenges or pushing related technologies, revisited past experience, and explored a possible re-use of existing superconducting magnets. Last not least, it reinforced the inter-laboratory collaborations within EuCARD, especially between CERN and its European, US, and Japanese partners.

Lectures

Title: Elements of a physics case for a High-Energy LHC
Author: Wells, James D
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 1-5

arXiv:1108.1115 [pdf]
Title: CERN Accelerator Strategy
Authors: M. Myers
Comments: 1 page, Contribution given to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, Republic of Malta, 14 - 16 Oct 2010
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 6
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1617 [pdf]
Title: HE-LHC beam-parameters, optics and beam-dynamics issues
Authors: O. Brüning, O. Dominguez, S. Myers, L. Rossi, E. Todesco, F. Zimmermann (CERN)
Comments: 6 pages, Contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 7-14
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1619 [pdf]
Title: Conceptual design of 20 T dipoles for high-energy LHC
Authors: L. Rossi, E. Todesco (CERN)
Comments: 7 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 13-19
Subjects: Accelerator Physics (physics.acc-ph)

Title: What can the SSC and the VLHC studies tell us for the HE-LHC?
Author: Wienands, U
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 20-26

arXiv:1108.1621 [pdf]
Title: A high energy LHC machine: experiments 'first' impressions
Authors: M. Nessi (CERN)
Comments: 3 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 27-29
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1625 [pdf]
Title: Progress in high field accelerator magnet development by the US LHC Accelerator Research Program
Authors: Gian Luca Sabbi (LBNL) for the LARP Collaboration
Comments: 7 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 30-36
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1868 [pdf]
Title: LBNL high field core program
Authors: S. Caspi (LBL, Berkeley)
Comments: 4 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 37-40
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1626 [pdf]
Title: KEK effort for high field magnets
Authors: T. Nakamoto (KEK, Tsukuba)
Comments: 4 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 41-44
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1627 [pdf]
Title: EUCARD magnet development
Authors: Gijs de Rijk (CERN)
Comments: 5 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 45-49

Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1869 [pdf]
Title: Status of Nb$_3$Sn accelerator magnet R&D at Fermilab
Authors: A.V. Zlobin (Fermilab)
Comments: 9 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 50-58
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1634 [pdf]
Title: Status of high temperature superconductor based magnets and the conductors they depend upon
Authors: J. Schwartz, F. Hunte, W.K. Chan, X.F. Gou, X.T. Liu, M. Phillips, Q.V. Le, G. Naderi, M. Turenne, L. Ye (North Carolina State U.)
Comments: 11 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 59-69
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1640 [pdf]
Title: 20 T dipoles and Bi-2212: the path to LHC energy upgrade
Authors: P.M. McIntyre, K. Damborsky, E.F. Holik, F. Lu, A.D. McInturff, N. Pogue, A. Sattarov, E. Sooby (Texas A&M University, College Station)
Comments: 5 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 70-74
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1870 [pdf]
Title: Heat loads and cryogenics for HE-LHC
Authors: D. Delikaris, L. Tavian (CERN)
Comments: 4 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 75-78
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1642 [pdf]
Title: HE-LHC: requirements from beam vacuum
Authors: J.M. Jimenez (CERN)
Comments: 4 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 79-82
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1643 [pdf]
Title: Beam screen issues
Authors: E. Métral (CERN)
Comments: 7 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 83-89

Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1644 [pdf]
Title: Synchrotron radiation damping, intrabeam scattering and beam-beam simulations for HE-LHC
Authors: A. Valishev (Fermilab)
Comments: 3 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 90-92
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1871 [pdf]
Title: Beam-beam studies for the High-Energy LHC
Authors: K. Ohmi (KEK, Tsukuba), O. Dominguez, F. Zimmermann (CERN)
Comments: 6 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 93-98
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1652 [pdf]
Title: Preliminary considerations about the injectors of the HE-LHC
Authors: R. Garoby (CERN)
Comments: 2 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 99-100
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1653 [pdf]
Title: Using tevatron magnets for HE-LHC or new ring in LHC tunnel
Authors: Henryk Piekarz (Fermilab)
Comments: 9 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 101-109
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1654 [pdf]
Title: Magnet design issues and concepts for the new injector
Authors: P. Fabbricatore (INFN, Genoa)
Comments: 6 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 110-115
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1655 [pdf]
Title: Using LHC as injector and possible uses of HERA magnets/coils
Authors: K.H. Mess (CERN)
Comments: 8 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 116-123
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1663 [pdf]
Title: Intensity issues and machine protection of the HE-LHC
Authors: R. Assmann (CERN)
Comments: 4 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 124-127
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1664 [pdf]
Title: Injection and dump considerations for a 16.5 TeV HE-LHC
Authors: B. Goddard, M. Barnes, W. Bartmann, J. Borburgh, C. Bracco, L. Ducimetière, V. Kain, M. Meddahi, V. Mertens, V. Senaj, J. Uythoven (CERN)
Comments: 6 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 128-133
Subjects: Accelerator Physics (physics.acc-ph)

arXiv:1108.1669 [pdf]
Title: Radiation protection issues after 20 years of LHC operation
Authors: D. Forkel-Wirth, M. Magistris, S. Roesler, C. Theis, L. Ulrici, H. Vincke, Hz. Vincke (CERN)
Comments: 3 pages, contribution to the EuCARD-AccNet-EuroLumi Workshop: The High-Energy Large Hadron Collider, Malta, 14 -- 16 Oct 2010; CERN Yellow Report CERN-2011-003, pp. 134-136
Subjects: Accelerator Physics (physics.acc-ph)

Title: Summary of session 1: introduction and overview
Author: J.P. Koutchouk and R. Bailey
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 137-139
Title: Summary of session 2: magnets for the HE-LHC
Author: L. Rossi and E. Todesco
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 140-142

arXiv:1202.3811 [pdf]
Title: Summary of session 3 on synchrotron radiation and beam dynamics
Authors: V. Shiltsev (Fermilab), E. Metral (CERN)
Comments: 2 pp. EuCARD HE-LHC10 AccNet mini-workshop on a High-Energy LHC, 14-16 Oct 2010: Villa Bighi, Malta
Subjects: Accelerator Physics (physics.acc-ph)

Title: Summary of session 4: HE-LHC injectors and infrastructure
Author: E. Prebys and L. Bottura
Journal-ref: CERN Yellow Report CERN-2011-003, pp. 145-148