

1. Record Nr.	UNINA9910131397803321
Autore	Lucio Rossi
Titolo	The High Luminosity Large Hadron Collider : the new machine for illuminating the mysteries of universe // edited by Oliver Brüning and Lucio Rossi
Pubbl/distr/stampa	World Scientific Publishing Co, 2015 New Jersey : , : World Scientific, , 2015
ISBN	981-4675-47-4
Descrizione fisica	1 online resource (xii, 393 pages) : colour illustrations; digital, PDF file (s)
Collana	Advanced series on directions in high energy physics The High Luminosity Large Hadron Collider
Disciplina	539.7/36
Soggetti	Large Hadron Collider (France and Switzerland) Physics Physical Sciences & Mathematics Nuclear Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction to the HL-LHC project / L. Rossi and O. Brüning -- The physics landscape of the High Luminosity LHC / M. Mangano -- The HL-LHC machine / I. Bejar, O. Brüning, P. Fessia, L. Rossi, R. Tomas and M. Zerlauth -- The HL-LHC accelerator physics challenges / S. Fartoukh and F. Zimmermann -- Interface with experimental detector in the high luminosity run / H. Burkhardt -- Superconducting magnet technology for the upgrade / E. Todesco, G. Ambrosio, P. Ferracin, J.M. Rifflet, G.L. Sabbi, M. Segreti, T. Nakamoto, R. Van Weekderen and Q. Xu -- Crab cavity development / E. Jensen and R. Calaga -- Powering the high luminosity triplets / A. Ballarino and J.P. Burnet -- Cryogenics for HL-LHC / L. Tavian, K. Brodzinski, S. Claudet, G. Ferlin, U. Wagner, R. Van Weelderden -- The "environmental" challenges: impact of radiation on machine components / M. Brugger, F. Cerutti and L. S. Esposito -- Radiation protection considerations / C. Adorisio, S. Roesler, C. Urscheler and H. Vincke -- Machine protection with a 700 MJ beam / T. Baer, R. Schmidt, J. Wenninger, D. Wollmann and M. Zerlauth -- Cleaning insertions and collimation challenges / S. Redaelli, R.B.

Appleby, A. Bertarelli, R. Bruce, J.M. Jowett, A. Lechner and R. Losito -- Long-range beam-beam compensation using wires / F. Zimmermann and H. Schmickler -- Impedance and component heating / E. Metral, F. Caspers, N. Mounet, T. Pieloni and B. Salvant -- Challenges and plans for the proton injectors / R. Garoby -- New injectors: the Linac4 project and the new H-source / J. Lettry and M. Vretenar -- Challenges and plans for the ion injectors / D. Manglunki -- Challenges and plans for injection and beam dump / M. Barnes, B. Goddard, V. Mertens and J. Uythoven -- Beam instrumentation and diagnostics for the LHC upgrade / E. Bravin, B. Dehning, R. Jones and T. Lefevre -- Heavy-ion operation of HL-LHC / J.M. Jowett, M. Schaumann and R. Versteegen -- Implications for operations / G. Arduini, M. Lamont, T. Pieloni and G. Rumolo.

Sommario/riassunto

This book provides a broad introduction to the physics and technology of the High Luminosity Large Hadron Collider (HL-LHC). This new configuration of the LHC is one of the major accelerator projects for the next 20 years and will give new life to the LHC after its first 15-year operation. Not only will it allow more precise measurements of the Higgs boson and of any new particles that might be discovered in the next LHC run, but also extend the mass limit reach for detecting new particles. The HL-LHC is based on the innovative accelerator magnet technologies capable of generating 11–13 Tesla fields, with effectiveness enhanced by use of the new Achromatic Telescopic Squeezing scheme, and other state-of-the-art accelerator technologies, such as superconducting compact RF crab cavities, advanced collimation concepts, and novel power technology based on high temperature superconducting links. The book consists of a series of chapters touching on all issues of technology and design, and each chapter can be read independently. The first few chapters give a summary of the whole project, of the physics motivation and of the accelerator challenges. The subsequent chapters cover the novel technologies, the new configurations of LHC and of its injectors as well as the expected operational implications. Altogether, the book brings the reader to the heart of technologies for the leading edge accelerator and gives insights into next generation hadron colliders.
