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The Muon Collider: Challenges and prospects

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Following the 2020 update of the Strategy for Particle Physics, the European Large National Laboratories Directors Group (LDG) initiated a new International collaboration to progress on the studies for the feasibility of a Muon Collider at 10+ TeV towards the goal of publishing a CDR in time for the next ESPPU at the end of the decade. The Collaboration elaborated a detailed resource loaded R&D roadmap necessary to prove the technologies involved, and is addressing the most urgent points on both the machine and detectors. The Collider aims at producing an integrated luminosity of 10 ab-1 at 10 TeV, with an intermediate step at 1.5 TeV delivering 1 ab-1. The muon collider presents several challenges, starting from a production target that will have to sustain a deposited power of 2÷4 MW, Superconducting Solenoids with large field on axis (5÷40 T) and subject to heavy irradiation, RF acceleration in magnetic fields, fast acceleration to cope with the short lifetime of muons, and finally the need to keep under control the neutrino radiation on surface. In this talk I will give a brief overview of all those challenges and provide examples of how the Collaboration is addressing them.

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