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Channeling at accelerators high-energy frontier and future developments from GALORE

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The energy frontier of particle physics is pushed forward by implementation of innovative technologies and approaches. Bent crystals can be used as a novel type of beam optics with steering power comparable to that of a magnetic dipole up to over 10^3 Tesla by exploiting the phenomenon of planar channeling. Several applications in accelerators have been proposed, such as beam extraction, and collimation. The latter case is being currently investigated at CERN as a possible upgrade for the High-Luminosity LHC project. The state-of-the-art fabrication process of the samples supplied by INFN to CERN will be described. The ultimate upgrade of this technology may be achieved through a high precision machining of a carefully designed microstructure on the bent crystal, which could enhance steering efficiency beyond current limits, up to 100%. The most recent strategies and results of the new GALORE project in order to accomplish this important development will be reported as well.

In-person participation

Yes

Primary author: ROMAGNONI, Marco (Istituto Nazionale di Fisica Nucleare)

Co-authors: BANDIERA, Laura (INFN Ferrara); GUIDI, Vincenzo (University of Ferrara and INFN Ferrara); MAZZOLARI, Andrea (INFN Ferrara); SOLDANI, Mattia (University of Ferrara and INFN Ferrara); Mr SCATIZZA, Luifi (INFN Ferrara Section); SYTOV, Alexei (INFN Ferrara); TAMISARI, Melissa (Istituto Nazionale di Fisica Nucleare)

Presenter: ROMAGNONI, Marco (Istituto Nazionale di Fisica Nucleare)

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