



Contribution ID: 1031 Contribution code: MOPL023

Type: **Poster Presentation**

Crystal collimation performance at the LHC with a 6.8 TeV proton beam

Monday 8 May 2023 16:30 (2 hours)

Crystal collimation is studied to improve the collimation efficiency with ion beams at the High-Luminosity Large Hadron Collider (HL-LHC). Bent crystals are used instead of conventional primary collimators to deflect high-energy halo particles at angles orders of magnitude larger than what can be achieved with scattering by conventional materials. Following the promising results obtained during Run 2 (2015-2018) and the first year of Run 3 (2022), this collimation technique is planned to be used operationally already for LHC Run 3 heavy-ion operation, starting in 2023, to mitigate the risk of magnet quenches from beams of higher energy and intensity. Tests with low-intensity proton beams are extremely important to characterize the crystal collimator hardware, assess the performance and investigate other operational aspects in preparation for the ion run. This paper presents the results of tests carried out in 2022 with proton beams at the record energy of 6.8 TeV.

Funding Agency

Research supported by the HL-LHC project.

Footnotes

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Session Classification: Monday Poster Session

Track Classification: MC1: Colliders and other Particle Physics Accelerators: MC1.T19: Collimation