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Operational experience, recent developments and plans for crystal collimation at the LHC

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The concept of crystal collimation exploits the peculiar properties of crystalline materials to deflect high-energy beam halo particles at angles orders of magnitude larger than what can be achieved with scattering by conventional materials used as primary collimators. This innovative technique is planned to be used to improve the collimation efficiency with heavy-ion beams at the Large Hadron Collider (LHC) and its High-Luminosity upgrade (HL-LHC). The unprecedented proton-equivalent energy range up to 7 TeV makes this technique particularly challenging, so a dedicated experimental program was put in place at the LHC to demonstrate the feasibility of this concept. This paper reviews the extensive operational experience gathered with a test stand during LHC Run 2 (2015-2018) with beams of record energy and intensity. An overview of the current plans and hardware upgrades carried out in preparation for deployment during operation with heavy-ion beams in Run 3 is also given.

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