Contribution ID: **521** Type: **Parallel session talk**

TWOCRYST: a proof-of-principle of a double-crystal setup for fixed-target experiments at the Large Hadron Collider (LHC)

Wednesday 23 August 2023 09:20 (15 minutes)

Different scenarios for fixed-target physics research are being considered at the Large Hadron Collider (LHC) as part of the Physics Beyond Collider (PBC) study at CERN. In the so-called double crystal setup, a first bent crystal channels a fraction of the LHC multi-turn halo and steers it onto an in-vacuum target. This is followed by a second crystal with a bending angle of several mrad. This allows measuring the precession of a polarized particles produced by the interaction between the 7 TeV protons and the target nuclei, using a vertex detector and a spectrometer. This implementation offers interesting prospects to measure electric and magnetic dipole moments of charmed short-lived baryons, like the Λ_c^+, that decay over too short distances to observe precession with conventional magnets. The complexity of this setup and the deployment of this technique with the high-intensity beams at the LHC are challenging. Therefore, a proof-of-principle layout has been conceived to address experimentally the key challenges of this proposal, as input to a future experiment. This contribution presents the challenges, status and plans for an imminent deployment at the LHC.

Collaboration / Activity

TWOCRYST

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Session Classification: T13 Accelerators for HEP

Track Classification: Accelerators for HEP