IPAC'25 - the 16th International Particle Accelerator Conference



Contribution ID: 2316 Contribution code: SUPS006

Type: Student Poster Presentation

Demonstrating beam splitting through stable islands formed by the third-order resonance at the CERN Super Proton Synchrotron

Sunday 1 June 2025 14:00 (2 hours)

In recent years, several new beam manipulation techniques have been proposed that exploit the crossing of nonlinear resonances and the use of stable islands of the transverse phase space. One such manipulation is a novel approach to slow extraction, which combines particle trapping in stable islands with the use of bent crystals to reduce losses on the extraction septum. As a first step towards testing this approach, measurements were performed at the CERN Super Proton Synchrotron (SPS) to demonstrate beam splitting using stable islands of the third-order resonance generated and controlled by sextupole and octupole magnets. The phase-space topology was reconstructed by displacing the beam and observing the turn-by-turn evolution of the signal of the beam position monitors. The beam splitting was achieved by varying both the machine tune and the radial steering of the beam. The measurement results were found to be in excellent agreement with the tracking simulations.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Work supported by the Wolfgang Gentner Programme of the German Federal Ministry of Education and Research (grant no. 13E18CHA).

Author: VERES, Dora (European Organization for Nuclear Research)

Co-authors: BARTOSIK, Hannes (European Organization for Nuclear Research); GIOVANNOZZI, Massimo (European Organization for Nuclear Research); PARASCHOU, Konstantinos (European Organization for Nuclear Research); FRANCHETTI, Giuliano (GSI Helmholtz Centre for Heavy Ion Research)

Presenter: VERES, Dora (European Organization for Nuclear Research)

Session Classification: Student Poster

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D02 Nonlinear Single Particle Dynamics Resonances, Tracking, Higher Order, Dynamic Aperture, Code Developments