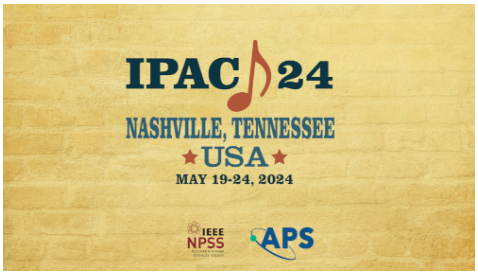

Contribution ID: **2198** Contribution code: **SUPC002** Type: **Student Poster Presentation**

Measurements of beam correlations induced via coupled resonance crossing in the CERN PSB

Sunday, May 19, 2024 2:00 PM (4 hours)

Beam profile measurements in the LHC and its injector complex show heavy tails in both transverse planes. From standard profile measurements, it is not possible to determine
if the underlying phase space distribution is statistically independent. A measurement campaign in the CERN PSB was carried out to introduce cross-plane dependence in bunched beams in controlled conditions, in view of characterizing the LHC operational beam distributions. The results of the measurement campaign demonstrate how heavy tails can be created via coupled resonance excitation of the lattice in the presence of space charge, in accordance with predictions from the fixed line theory. The coupled resonance introduces dependence between the different planes, which persists after the resonance excitation is removed.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

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Session Classification: Student Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.A04 Circular Accelerators