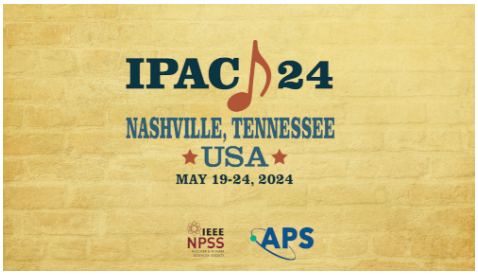

Contribution ID: **2011** Contribution code: **WEBN1** Type: **Contributed Oral Presentation**

Complete 6D tracking of a single electron in the IOTA ring

Wednesday, 22 May 2024 11:30 (20 minutes)

We present the results of the first experiments on 6-dimensional phase-space tracking of a single electron in a storage ring, using a linear multi-anode photomultiplier tube for simultaneously measuring transverse coordinates and arrival times of synchrotron-radiation pulses. This technology makes it possible to fully reconstruct turn-by-turn positions and momentums in all three planes for a single particle. Complete experimental particle tracking enables the first direct measurements of dynamical properties, including invariants, amplitude and energy dependence of tunes with exceptional precision, and chaotic behavior.

Footnotes

Funding Agency

This work has been authored by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the U.S. Department of Energy, Office of Science, Office of High Energy Physics

Paper preparation format

Region represented

North America

Primary author: ROMANOV, Alexander (Fermi National Accelerator Laboratory)

Co-authors: STANCARI, Giulio (Fermi National Accelerator Laboratory); SANTUCCI, James (Fermi National Accelerator Laboratory)

Presenter: ROMANOV, Alexander (Fermi National Accelerator Laboratory)

Session Classification: WEBN: Beam Instrumentation, Controls, Feedback and Operational Aspects (Contributed)

Track Classification: MC6: Beam Instrumentation, Controls, Feedback, and Operational Aspects: MC6.T03 Beam Diagnostics and Instrumentation