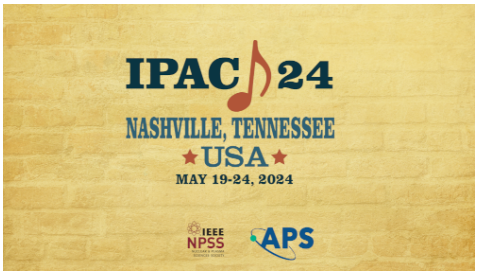

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Experimental verification of integrability in a Danilov-Nagaitsev lattice using machine learning

Monday, 20 May 2024 16:00 (2 hours)

In non-linear optics, achieving integrability can enhance the dynamic aperture in storage rings. We analyze turn-by-turn phase-space data from our Danilov-Nagaitsev lattice implementation at Fermilab's Integrable Optics Test Accelerator using machine learning. AI Poincare estimates conserved quantities from experimental data without prior knowledge of the invariant structure, showing qualitative agreement with theoretical predictions. Additionally, one of the two learned invariants exhibits superior conservation compared to known theoretical expressions.

Footnotes

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Primary author: BANERJEE, Nilanjan (Fermi National Accelerator Laboratory)

Co-authors: ROMANOV, Alexander (Fermi National Accelerator Laboratory); VALISHEV, Alexander (Fermi National Accelerator Laboratory); STANCARI, Giulio (Fermi National Accelerator Laboratory); WIELAND, John (Fermi National Accelerator Laboratory); KUKLEV, Nikita (Argonne National Laboratory)

Presenter: BANERJEE, Nilanjan (Fermi National Accelerator Laboratory)

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