

Accelerator Physics at Fermilab's IOTA ring

The Integrable Optics Test Accelerator (IOTA) at the Fermilab Accelerator Science and Technology (FAST) facility has been operating since 2018. The IOTA ring was first commissioned with 100-MeV electrons and, to date, performed three experimental runs. The IOTA research program aims at attaining maximum beam intensities and brightness in future ring accelerators while minimizing the accelerator scale and cost. Along this direction, the key research areas are i) suppression of coherent beam instabilities by Landau damping; ii) mitigation of space-charge effects, and iii) beam cooling. The flexibility of the IOTA ring allows it to cover a wide range of complementary studies, such as experiments with a single electron, studies of undulator radiation and to test IOTA with low emittance beams. The most-recent IOTA Run-3 physics program was focused on the world's first demonstration of Optical Stochastic Cooling. In the near future, a proton injector will be constructed and commissioned, which would complete a premier accelerator physics test facility with lasers, linacs, a ring, and with photons, electrons, and protons. This talk will describe the accelerator science program at IOTA and will highlight the emerging collaboration opportunities.

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