LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

Journal Club

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A Genetic Algorithm for Optimizing Nonlinearities in Diffraction Limited Storage Rings

Storage ring X-ray light sources attract over 20,000 users a year, with intense competition among facilities to produce the brightest beams. Recent advances in accelerator physics allow for the development of storage ring light sources with a factor of 10 improvement in spectral brightness. These machines have particularly strong nonlinearities, and standard approaches to optimizing the nonlinearities become inadequate. I will describe the development of a multi-objective genetic algorithm for optimizing nonlinearities that succeeds by targeting several properties of the model. The algorithm presented here was developed as part of the Swiss Light Source upgrade and reliably generates optimal chromaticity correction schemes while requiring relatively modest computing resources.

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2:30pm

120 Physical Sciences Bldg.