Contribution ID: **1754** Contribution code: **WEPA105** Type: **Poster Presentation**

Efficient computation of two-dimensional coherent synchrotron radiation with neural networks

Wednesday, 10 May 2023 16:30 (2 hours)

The design and tuning of accelerators are both complicated processes involving many physical effects. Of these, the modeling of coherent synchrotron radiation has long been one of the most complicated and time consuming. This is especially true when modeling two and three-dimensional CSR, which is often neglected in state-of-the-art accelerator modeling due to its time consuming nature. We present a neural network designed to model 2D CSR, demonstrating both faithful accuracy to the physics and a dramatic speedup over even the fastest existing codes. We study its performance in the context of the last bunch compressor of the FACET-II facility, where the intense short pulse demands at least a 2D treatment, and find that we can reproduce the results of more standard tracking codes in a fraction of the time.

Funding Agency

Department of Energy, LDRD program at SLAC, contract DE-AC02-76SF00515. Also the Stanford Graduate Fellowship and the Stanford Siemann fellowship.

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: ROBLES, River (Stanford University)

Co-authors: EDELEN, Auralee (SLAC National Accelerator Laboratory); LOU, William (SLAC National Accelerator Laboratory); MAYES, Christopher (SLAC National Accelerator Laboratory); ROUSSEL, Ryan (SLAC National Accelerator Laboratory)

Presenter: ROBLES, River (Stanford University)

Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D13: Machine Learning