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Utilizing differentiable beam dynamics code for simulated optimization

Simulation optimization plays a crucial role in designing new accelerators and enhancing the performance of existing ones. In this contribution, we utilize the innovative differentiable simulation code Cheetah for parameter optimization, specifically aiming to maximize the THz pulse generated by coherent synchrotron radiation (CSR) at FLUTE. Our approach involves implementing a differentiable model of the CSR field produced by arbitrary bunch distributions. Initially, we employ gradient descent for efficient parameter optimization. We then leverage the strengths of Bayesian optimization to demonstrate its capability in optimizing under collective effects such as space charge, and highlight the potential of this approach for guiding online optimization.

Speed talk:

I am unwilling/unable to present a speed talk

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