Contribution ID: **218** Contribution code: **TUP067** Type: **Poster Presentation**

Mitigation of Coherent Synchrotron Radiation by Bunch Profile Optimization and Shielding

Tuesday 12 August 2025 16:00 (2 hours)

The mitigation of the effects of coherent synchrotron radiation (CSR) is a key challenge in generating high brightness beams. Shielding by parallel plates installed in the dipole magnet vacuum chambers shows promise, both in simulation and experiment*at small shielding gap separations. In this work, we consider a beam traversing a chicane with larger cm-scale separations on each dipole, necessitating the combined use of longitudinal profile shaping and shielding to reduce emittance growth. We model the radiated CSR using a 3D integrated Green's function technique that accounts for the complete 6D phase space of the bunch along with image charges to model shielding. This method is used in conjunction with a genetic algorithm to optimize the longitudinal current profile. Our results indicate current profiles that differ to results derived without shielding** and allow for effective mitigation of emittance growth at cm-scale gaps. We will present details of the simulation and optimization method along with future plans, including ongoing experiments at the Argonne Wakefield Accelerator as part of a collaboration that seeks to investigate the effects of CSR on beams.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

- Yakimenko et al., Phys. Rev. Lett. 109, 164802, 2012 ** Mitchell et al., Phys. Rev. ST Accel. Beams 16, 060703, 2013

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I have read and accept the Privacy Policy Statement

Yes

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