

# Measurement of CSR-affected beams using generative phase space reconstruction

*Sunday 25 August 2024 16:00 (2 hours)*

Linear accelerators with dispersive elements experience projected emittance growth due to coherent synchrotron radiation (CSR) effects which become relevant for highly compressed beams. Even though this is a widely known effect, conventional measurement techniques are not precise enough to resolve the multi-dimensional effects in detail, namely the different rotations of transverse phase space slices throughout the longitudinal coordinate of the bunch. In this work, we apply our generative-model-based six-dimensional phase space reconstruction method in the detailed measurement of CSR effects at the Argonne Wakefield Accelerator Facility in simulations. Additionally, we study the current resolution limitations of the phase space reconstruction method and perform an analysis of its accuracy and precision in simulated cases.

## Footnotes

## Funding Agency

This work was supported by the U.S. National Science Foundation under Award PHY-1549132, the Center for Bright Beams.

**Primary author:** GONZALEZ-AGUILERA, Juan Pablo (University of Chicago)

**Co-authors:** ROUSSEL, Ryan (SLAC National Accelerator Laboratory); EDELEN, Auralee (SLAC National Accelerator Laboratory); KIM, Young-Kee (University of Chicago)

**Presenter:** GONZALEZ-AGUILERA, Juan Pablo (University of Chicago)

**Session Classification:** Student Poster Session

**Track Classification:** MC4: Technology: MC4.1 Beam diagnostics