

# First-principle beam-dynamics simulations of alpha magnets for bunch compression of bright beams

*Tuesday 27 August 2024 16:00 (2 hours)*

Producing bright electron beams is crucial for coherent light sources, where increasing the peak current is typically accomplished through bunch compression in magnetic chicanes. Alpha magnets, with their unique phase-space manipulation capabilities, have emerged as an attractive choice for compressing sub-10 MeV electron beams generated by radio frequency photoinjectors. This paper presents detailed numerical modeling of the beam dynamics of high-charge, bright bunches undergoing compression within an alpha magnet. The model incorporates space-charge effects and coherent synchrotron radiation, providing a comprehensive understanding of the complex interactions and behaviors of the electron beams during the compression process.

## Footnotes

## Funding Agency

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