
Contribution ID: **477** Contribution code: **MOCN2** Type: **Contributed Oral Presentation**

# Focusing of relativistic electron beams with permanent magnetic solenoids

*Monday 2 June 2025 15:20 (20 minutes)*

Achieving strong focusing of MeV electron beams is a critical requirement for advanced beam applications such as ultrafast electron diffraction (UED). To address this, a novel permanent magnetic solenoid (PMS) has been designed, fabricated, and tested. The solenoids provide a compact and efficient solution for delivering high magnetic fields to focus short, low-emittance electron bunches. Field measurements demonstrated excellent agreement with simulation models, validating the solenoid design. The beam tests employed a MeV electron injector to study the focusing properties of the PMS under various configurations. Results showed significant beam size reduction, confirming its suitability for ultrafast beam applications.

## Footnotes

## Paper preparation format

LaTeX

## Region represented

America

## Funding Agency

**Author:** XU, Tianzhe (SLAC National Accelerator Laboratory)

**Co-authors:** KULKARNI, Atharva (Particle Beam Physics Lab (PBPL)); SCHAAP, Brian (University of California, Los Angeles); DUNCAN, Cameron (Cornell University (CLASSE)); GARCIA, David (Particle Beam Physics Lab (PBPL)); DENHAM, Paul (Particle Beam Physics Lab (PBPL)); MUSUMECI, Pietro (University of California, Los Angeles); ENGLAND, Robert (SLAC National Accelerator Laboratory)

**Presenter:** XU, Tianzhe (SLAC National Accelerator Laboratory)

**Session Classification:** MOCN:Accelerator Technology and Sustainability (Contributed)

**Track Classification:** MC7: Accelerator Technology and Sustainability: MC7.T34 Permanent Magnets