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Physics with extreme beams at FACET-II

Friday 15 August 2025 11:00 (30 minutes)

With today's accelerator facilities such as the 10 GeV FACET-II facility at SLAC National Accelerator Laboratory, extreme beam physics is emerging as a promising science area where ultrashort and dense electron beams can be used as a source of TV/m fields, enabling high field matter interaction and new applications in photon science and particle acceleration. By delivering extreme beams with peak current reaching 100 kA and enabling its interaction with lasers, plasmas, and solids, FACET-II has a broad science program ranging from high-field plasma-based acceleration, laboratory astrophysics, extreme focusing and attosecond sources, FCC-ee studies and laser particle control and collimation for colliders, and probing quantum electrodynamics near the Schwinger critical field. After presenting an overview of the physics opportunities offered by the FACET-II facility, I will highlight recent breakthroughs achieved at FACET-II, such as the most precise measurements of quantum radiation reaction to date, the generation of 100-kA class beams by laser-electron beam shaping, the demonstration of a brightness and energy transformer, efficient plasma acceleration with percent-level field uniformity, wakefield mapping and probing, and extreme beam focusing by leveraging intense coherent transition radiation in the near field or plasma fields.

Please consider my poster for contributed oral presentation

No

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

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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