SLAC NATIONAL ACCELERATOR LABORATORY

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Request for One-Page Submissions

Injectors and Beam Physics for Future Accelerators

SLAC National Accelerator Laboratory, September 14-15, 2026

Indico: https://indico.slac.stanford.edu/event/10540

Particle accelerators underpin discovery across high-energy physics, basic energy sciences, nuclear physics, accelerator R&D, and beyond. Their future hinges on reliably delivering beams with higher intensity, higher phase-space density, and exceptional stability. Meeting these goals requires coordinated progress in source and injector physics, collective-effect mitigation, advanced diagnostics, and predictive control.

To help focus the workshop discussions and to enable contributions from colleagues who may not be able to attend, we invite submissions of up to one page in length. We encourage concise, quantitative, and specific input; bullet points and figures are welcome. Submissions may address one or more of the topics below, but contributors should not feel limited by these questions. Submissions may be emailed to dstorey@slac.stanford.edu.

High-Intensity Beams for Colliders

- What are the principal limitations to achieving high-charge, high-quality beams in present and proposed injectors?
- What source, injector, transport, accumulation, or ring-based R&D is needed to overcome these limitations?
- What approaches are needed to diagnose, control, and mitigate beam halo, losses, instabilities, and collective effects in high-intensity injector and storage-ring systems?

High-Brightness Beams for Light Sources and Other Applications

- What are the most important scientific or facility opportunities enabled by ultra-low-emittance, high-phase-space-density beams?
- What advances in injector performance are needed to realize these opportunities?
- Which approaches are most promising for generating and preserving ultra-low-emittance beams, including high-gradient injectors, advanced cathodes, novel beam-shaping techniques, and plasma-based injection?
- What are the key challenges in generating high-peak-current (kA- to MA-class) beams while maintaining beam quality?
- How can space charge, intrabeam scattering, coherent synchrotron radiation, microbunching, wakefields and other collective effects be understood, mitigated, or exploited?
- Which experimental demonstrations would provide the most compelling near-term proof of principle?

Facilities and Experimental Paths Forward

- What existing or new test facilities are needed to validate critical injector, beam-physics, diagnostics, and control concepts?
- What beam parameters, experimental flexibility, diagnostics, access models, and operational modes should such facilities provide?
- What are the highest-priority near-term experiments, and what longer-term investments are needed to enable transformative advances?

We particularly welcome submissions that identify a well-defined challenge, state quantitative goals, describe a credible experimental or modeling path, and explain the broader impact on future accelerator facilities and scientific programs.