Nuclear Photonics

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P3 platform at ELI Beamlines for High Energy Density Physics and Ultrahigh Intensity Interactions

The plasma physics platform (P3) in the E3 experimental hall is a state-of-the-art facility designed for advanced research in laser-plasma and laser-matter interactions. P3, dedicated to plasma physics, offers access to multiple beams, for experiments in the field of High Energy Density Physics (HEDP) and Ultrahigh-Intensity Interactions. The P3 facility has been available to users since 2023, with the non-compressed L4-ATON laser (L4n) delivering pulses up to 500 J (1 to 10 ns) at an unprecedented rate of one shot every three minutes. The L4 system will achieve 10 PW power (L4f: 1.5 kJ, 150 fs) by early 2025. Additionally, the L3-HAPLS laser, currently operating at 0.5 PW (12 J, 27 fs, 3.3 Hz), will be upgraded to 1 PW.
Whether used individually or in combination, these two lasers significantly enhance data collection speed and efficiency for plasma physics research, particularly in ns-kJ HEDP experiments, which typically rely on low-repetition facilities (often one shot per hour).
The presentation will provide a comprehensive overview of the experimental infrastructure, highlighting both current capabilities and future opportunities for user operations.

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