

State-of-the-Art Laser-Driven Electron Accelerators and Applications at ELI-ERIC

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Laser wakefield acceleration (LWFA) enables gradients up to 1 GV/cm in plasma and the generation of femtosecond electron beams. At the Extreme Light Infrastructure ERIC (ELI ERIC), 4 dedicated laser electron accelerators have been commissioned and are available for access via User calls. The high-repetition-rate ALFA and eSYLOS accelerators deliver ultra-relativistic electron beams at the highest energy worldwide (tens of MeV) at 1 kHz. Such beams are used for radiobiology experiments and for the generation of tertiary particle sources (positrons, X-rays and neutrons). The high-energy ELBA and ePW accelerators deliver multi-GeV at Hz repetition rate. Primary use of these beams is QED, radiobiology and radiotherapy investigations and muon production.