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**Progress in Laser Wakefield Electron Acceleration and applications at CoReLS Multi-PW Laser Facility**

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Research on laser wakefield accelerators (LWFA) has made a great progress with the development of ultrahigh intensity lasers around the globe, enabling the generation of electron beams with energy as high as possible [1]. In addition, many groups focused to produce monoenergetic, low divergence electron beams [2], essential for applications such as free electron laser (FEL) [3], very high energy electron (VHEE) therapy, positron generation and nonlinear Compton scattering (NCS) [4]. Center for Relativistic Laser Sciences (CoReLS), one of the pioneering institutes in the development of PW lasers [5], recently recorded the highest laser intensity (1023 W/cm2) [6], and has worked on electron acceleration, producing high quality, multi-GeV electron beams and its applications.

In this talk, first I will introduce the CoReLS laser facility and then present the recent progress in laser wakefield electron acceleration, producing stable and reproducible 3 GeV electrons from a He plasma wake driven by a PW laser pulse. The monoenergetic electron beam was utilized for several applications such as colliding with an ultra-intense laser pulse (I>1020 W/cm2), generating bright high-energy gamma beams from nonlinear Compton scattering, as well as high energy Bremsstrahlung and betatron radiation, and producing high energy positron.

**References**

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