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SP5: Preliminary On-table and Photoelectron Results from the PITZ Quasi Ellipsoidal Photocathode Laser System

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The optimization of photoinjectors is crucial for the successful operation of linac-based free electron lasers, and beam dynamics simulations have shown that ellipsoidal photocathode laser pulses result in significantly lower electron beam emittance than that of conventional cylindrical pulses.

Therefore, in collaboration with the Institute of Applied Physics (Nizhny Novgorod, Russia) and the Joint Institute of Nuclear Research (Dubna, Russia), a laser system capable of generating quasi-ellipsoidal laser pulses has been developed and installed at the Photo Injector Test facility at DESY, Zeuthen site (PITZ). The pulse shaping has been realized using the spatial light modulator technique, characterized by cross-correlation and spectrographic measurements, and is demonstrated with electron beam measurements.

In this contribution the overall setup, operating principles, and results of first regular electron beam measurements will be presented together with corresponding beam dynamics simulations. Furthermore the numerous improvements of the simplified re-design currently under construction shall be detailed.

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