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Chirped Pulse Laser Shaping for High Brightness Photoinjectors

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Photoemission laser shaping is essential for both beam brightness and advanced accelerator concepts, therefore is an important R&D at the Photo Injector Test Facility at DESY in Zeuthen (PITZ). The laser pulse shaper presented here is based on spectral amplitude modulation of chirped laser pulses. In this approach one can do temporal-spatial coupled laser shaping, i.e. 3D shaping. The laser shaping is done at 1030 nm with spatial light modulators, and then converted to 257.5 nm through harmonic generation for photoemission. Experimental results of laser pulse shaping and shape preservation through harmonic generation are presented for different cases: spatial shaping, temporal shaping and full 3D shaping. Electron beam testing results will also be presented.

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