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Laser-driven electron beams and their applications

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We present the activities in laser-wakefield acceleration at Garching. Stable electron beams have been characterized and used to drive a variety of all-optical x-ray sources. The betatron-xrays have been demonstrated to be suitable for taking high-resolution phase-contrast tomograms of biological samples, while scattering a counter-propagating laser pulse off the electron beam yields a quasi-monochromatic, tunable Thomson source. Its spectral characterization directly reveals characteristics of the nonlinear scattering regime for the first time. Finally, we will present the latest plans and results from the updated ATLAS laser at the newly created LEX laboratory in Garching.

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