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Investigation of electron beam dynamics from the Betatron radiation pattern of laser-wakefield accelerators

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Betatron radiation emitted by accelerated electrons in laser-wakefield accelerators can be used as a diagnostic tool to investigate electron dynamics during the acceleration process. Utilizing a 2D X-ray imaging spectroscopy technique we analyse the spectral dependence of the emitted Betatron pattern which basically represents certain electron beam parameters inside the plasma cavity. We also compare to the case when electrons are intentionally injected off-axis by introducing a pulse front tilt on the driver laser beam. The experiments are carried out with the Draco Ti:Sapphire laser system at HZDR.

Autore principale: Sig. KOEHLER, Alexander (Helmholtz-Zentrum Dresden - Rossendorf)

Coautore: Dr. IRMAN, Arie (Helmholtz Zentrum Dresden Rossendorf); Sig. JOCHMANN, Axel (Helmholtz-Zentrum Dresden-Rossendorf); Sig. COUPERUS, Jurjen (Helmholtz-Zentrum Dresden - Rossendorf); Sig. ZARINI, Omid (Helmholtz-Zentrum Dresden - Rossendorf e.V.); Sig.ra LUCAS, Susanne (Helmholtz-Zentrum Dresden - Rossendorf); Prof. SCHRAMM, Ulrich (Helmholtz-Zentrum Dresden-Rossendorf)

Relatore: Sig. KOEHLER, Alexander (Helmholtz-Zentrum Dresden - Rossendorf)

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