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Electron acceleration in merging laser wakefields

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Merging laser beams can be used to replenish the driver in a seamless multistage laser-plasma accelerator, and can enhance the X-ray emission produced by betatron electron oscillations. We experimentally demonstrate merging of two laser wakefields in plasma. A 150 TW peak-power laser beam is split in two halves which are focused at a small angle in a gas. Each laser pulse drives a plasma wakefield and accelerates relativistic electrons. When the laser pulses are synchronized, a single, high-charge electron beam is emitted along the bisector angle.

Primary author: LUNDH, Olle (Lund University)

Co-authors: GALLARDO GONZALEZ, Isabel (Lund University); EKERFELT, Henrik (Lund University); BJÖRK-LUND SVENSSON, Jonas (Lund University, Department of Physics); Dr GATTI, Giancarlo (CLPU); Dr GUENOT, Diego (Lund University, Department of Physics); Dr GONOSKOV, Arkady (University of Gothenburg); HANSSON, Martin (Atomic Physics, Lund University); Dr JOSE, Perez-Hernandez (CLPU); Prof. MARKLUND, Mattias (University of Gothenburg); Mr SALGADO, Carlos (CLPU); Dr WALLIN, Erik (Chalmers University of Technology); Mr ZERAOULI, Ghassan (CLPU)

Presenter: LUNDH, Olle (Lund University)

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