

Resonantly-enhanced multiple-pulse laser plasma wakefield acceleration

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We present progress on experiments being conducted at Oxford University on resonantly-enhanced multiple-pulse laser plasma wakefield acceleration (MP-LWFA). Our initial experiments concentrate on the use of frequency domain holography to visualise wakefields driven in helium by a single high energy pulse and then short trains of pulses generated by either appropriately chirping the single pulse and passing it through a birefringent crystal, or by using stacked Michelson interferometers. The use of trains of low energy laser pulses may enable the application of efficient, high repetition rate ($> 1\text{kHz}$) fibre laser systems to drive MP-LWFA in the future. We present numerical simulations of the electron density oscillations and accelerating gradients that we expect to produce with these pulse trains and first results from our experiment.

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