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Filamentation in Laser Wakefields EVA LOS, U. Manchester, UK, and STFC Rutherford Appleton Laboratory, UK, and UC Davis, USA, RAOUL TRINES, STFC Rutherford Appleton Laboratory, UK, LUIS SILVA, GoLP/IPFN, Instituto Superior Tecnico, Lisbon, Portugal, ROBERT BINGHAM, STFC Rutherford Appleton Laboratory, UK and U. Strathclyde, Glasgow, UK — Laser filamentation instability is observed in plasma wakefields with sub-critical densities, and in high density inertial fusion plasmas. This leads to non-uniform acceleration or compression respectively. Here, we present simulation results on laser filamentation in plasma wakefields. The 2-D simulations are carried out using the particle-in-cell code Osiris. The filament intensity was found to increase exponentially before saturating. The maximum amplitude to which the highest intensity filament grew for a specific set of parameters was also recorded, and plotted against a corresponding parameter value. Clear, positively correlated linear trends were established between plasma density, transverse wavenumber k, laser pulse amplitude and maximum filament amplitude. Plasma density and maximum filament amplitude also showed a positive correlation, which saturated after a certain plasma density. Pulse duration and interaction length did not affect either filament intensity or transverse k value in a predictable manner. There was no discernible trend between pulse amplitude and filament width.

Eva Los
University of Manchester, Manchester

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