

Laser-based plasma stabilization effect on a particle PWFA beam

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Efforts towards the next generation of compact accelerators based on plasma wakefield acceleration (PWFA) are aimed at enabling their application in various fields, including basic research, medicine, and industrial uses. To achieve this goal, significant focus is directed towards controlling the plasma creation process, ensuring the development of a time-jitter free channel, and maintaining stability, particularly in terms of uniformity and reproducibility. At SPARC_LAB, we are developing a beam driven PWFA, where an electron bunch drive the wakefield in the plasma and a second bunch, at ps delay from the first, is accelerated by the plasma. In this contribution, we present the results of an experimental campaign using a gas-filled discharge-capillary where the plasma and its generation are stabilized by triggering its ignition with an external laser pulse. The results show an efficient stabilization of the energy of the plasma accelerated beam.

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