

Abstract Submitted
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Staging laser plasma accelerator using plasma mirrors¹ DMITRIY PANASENKO, ANTHONY J. GONSALVES, KEI NAKAMURA, ANTHONY J. SHU, CHEN LIN, NICHOLAS MATLIS, GUILLAUME PLATEAU, CAMERON G.R. GEDDES, CSABA TOTH, ERIC ESAREY, CARL SCHROEDER, WIM P. LEEMANS, Lawrence Berkeley National Laboratory, LOASIS TEAM — One of the main challenges in staging plasma based Laser Wakefield Accelerators (LWFA) lies in incoupling laser energy into subsequent accelerating stages while preserving high acceleration gradient and without resorting to complicated e-beam transport. In this presentation we will describe a novel approach to laser incoupling based on reflection off supercritical plasma surface commonly referred to as plasma mirror. Using a plasma mirror as a last reflection surface before incoupling the laser into the accelerating stage will allow avoiding damage of conventional optics by an intense laser pulse and result in drastic reduction of distance between the accelerating stages. Here initial experimental results are presented on realizing this important concept for staging an LWFA and main challenges of this method are discussed such as practical realization of renewable surface for plasma mirror production, reflectivity, matching the reflected laser into plasma channel and effects on the emittance of the electron beam.

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Dmitriy Panasenکو
Lawrence Berkeley National Laboratory

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