

Experimental Demonstration of Laser Guiding and Wakefield Acceleration in a Curved Plasma Channel

mercoledì 20 settembre 2023 10:10 (30 minuti)

Curved plasma channels have been proposed to guide intense lasers for various applications, such as x-ray laser emission, compact synchrotron radiation, and multistage laser wakefield acceleration. In this talk, we will introduce our recent study on a carefully designed experiment showing evidences of intense laser guidance and wakefield acceleration in a centimeter-scale curved plasma channel. Both experiments and simulations indicate that when the channel curvature radius is gradually increased and the laser incidence offset is optimized, the transverse oscillation of the laser beam can be mitigated, and the stably guided laser pulse excites wakefields and accelerates electrons along the curved plasma channel to a maximum energy of 0.7 GeV. Our results also show that such a channel exhibits good potential for seamless multistage laser wakefield acceleration. After that, a brief introduction to our 200+300TW laser system and experimental platform on laser plasma acceleration and QED-plasma at Shanghai Jiao Tong university will be given.

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Classifica Sessioni: Plenary session

Classificazione della track: Invited