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Enhancing ion acceleration using composite targets¹ S.S. BULANOV, University of California, M. CHEN, L. YU, C.B. SCHROEDER, E. ESAREY, W.P. LEEMANS, Lawrence Berkeley National Laboratory — The effective combination of different regimes of ion acceleration and manipulation of the ion spectra using composite targets is reported. First, the intense laser pulse interaction with the thin solid density foil followed by near critical density (NCD) plasma is considered. In this case a combination of the initial radiation pressure acceleration of the foil with the further acceleration by the bubble longitudinal field in the NCD plasma, as the accelerated foil becomes transparent to the laser pulse, leads to a significant enhancement of maximum ion energy compared to the case of a single foil. Second, the case of an ultra-thin foil placed inside the hollow capillary is considered. Here the ions are accelerated by the radiation pressure of the guided laser pulse. Such laser target design leads to the production of collimated ion beams.

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Stepan Bulanov
University of California

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