

Abstract Submitted
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Quasi-monoenergetic ions from laser-triggered multi-stage particle acceleration¹ V. YU. BYCHENKOV, P.N. Lebedev Physics Institute, RAS, Moscow, Russia, G. I. DUDNIKOVA, Inst. of Computational Technologies, RAS, Novosibirsk, Russia, W. ROZMUS, R. FEDOSEJEVS, University of Alberta, Edmonton, Alberta, Canada, A. MAKSIMCHUK, FOCUS Center, University of Michigan, Ann Arbor, Michigan, USA — A production of high quality beams of ions has received considerable attention throughout the last few years because of their potential for applications in science, technology, and medicine. In this paper we present two schemes for laser generation of quasi-monoenergetic ion bunches based on 2D PIC simulations. In the first method quasi-monoenergetic ion bunch is generated by twin laser pulse involving a pre-pulse and subsequent main pulse both of the ultra-short duration. The space-time parameters and energy spectrum are obtained. The second scheme exploits the effect of light ion acceleration at the heavy ion front. We found this effect to be well pronounced for moderate laser intensity ($\sim 10^{18}$ W/cm²) and pulse duration (~ 1 ps) by using 2D PIC simulation of laser interaction with thin CD₂ foils. Quasi-monoenergetic deuterons form a jet from the rear side of the foil with the energy ~ 1 MeV. The conversion efficiency to these quasi-monoenergetic ions is 10^{-3} .

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Wojciech Rozmus
University of Alberta

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