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Effects of Light Ion Contaminants on the Laser Break-Out Afterburner[1] B.J. ALBRIGHT, L. YIN, B.M. HEGELICH, KEVIN J. BOWERS[2], K.A. FLIPPO, T.J.T. KWAN, J.C. FERNÁNDEZ, Los Alamos National Laboratory, Los Alamos NM 87545 USA — A novel laser ion acceleration mechanism was reported by Yin et al. [Laser and Particle Beams **24**, 291; see also invited talk by L. Yin this meeting] that allows, through careful target and laser conditioning, greatly enhanced peak beam ion energy (> 2 GeV energy carbon ions with an $I = 10^{21}$ W/cm^2 laser) and conversion efficiency from laser to fast ions. After a brief phase of target normal sheath acceleration (TNSA), the break-out afterburner (BOA) undergoes a period of enhanced TNSA followed by intense ion acceleration associated with penetration of the laser through the thin target. One of the outstanding questions regarding realization of the BOA experimentally is whether cleaning of ultra-thin targets is required to remove protons that collect on the target. Particle-in-cell simulations of BOA with and without contaminants will be shown. These simulations, using the LANL VPIC code, can be used to assess the effects on ion acceleration and beam quality resulting from the presence of contaminants.

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