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Highly Directional Deuteron Acceleration in Nanowire Arrays Irradiated at Highly Relativistic Energies CHASE CALVI, ALDEN CURTIS, SHOUJUN WANG, YONG WANG, ALEX ROCKWOOD, REED HOLLINGER, ADAM MOREAU, VYACHESLAV SHLYAPTSEV, COLORADO STATE UNIVERSITY, VURAL KAYMAK, ALEXANDER PUKHOV, Institut fr Theoretische Physik, Heinrich-Heine-Universitt Dsseldorf, JORGE ROCCA, COLORADO STATE UNIVERSITY — It has recently been shown that the irradiation of deuterated polyethylene nanowire arrays with an ultra-high contrast laser pulse of relativistic intensity can accelerate ions to multi-MeV energies and efficiently produce quasi-monoenergetic neutrons from DD fusion reactions1. Here we demonstrate the highly directional nature of ions with energy greater than 10 MeV being accelerated off the front surface of the nanowire arrays, with a narrow cone of emittance with a FWHM down to 7.5 degrees. Results of ion energy distribution measurements and beam directionality will be compared with 3D- relativistic PIC simulations. Preliminary results from a pitcher-catcher experiment to produce neutrons from D-Be and D-Li fusion reactions will be presented. 1. Alden Curtis, et al., "Micro-Scale Fusion in Dense Relativistic Nanowire Array Plasmas", Nature. Comm. 9, 1077 (2018)
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