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Mono-energetic ion beams accelerated in the interaction of an ultrashort intense laser with ultra-thin solid targets[1] JUN LI, Center for Energy Research, Univ of California - San Diego, ALEXEY AREFIEV, Center for High Energy Density Science, University of Texas, Austin, CHRISTOPHER MCGUFFEY, FARHAT BEG, Center for Energy Research, Univ of California - San Diego
— We performed particle-in-cell (PIC) simulations to study the ion acceleration by the interaction of an ultra-short(35fs) intense laser (10^{20}W/cm^2) with ultra-thin(6-100nm) copper targets. We aimed at investigating how ions are accelerated from thin targets, and focus on the regime in which targets remain intact and not broken through by the laser pulse. The target thicknesses were scanned, and we found that the ionization of copper ions to high Z states occurred during the acceleration. The mono-energetic high Z ion beams were observed only for the target thickness of 20nm with energies near 400 MeV. We conducted the particle tracking diagnostic to study the underline physics and mechanism of the acceleration, and the details will be presented in the meeting. This work was performed using HPC resources provided by the Texas Advanced Computing Center at the University of Texas; This work also used the Extreme Science and Engineering Discovery Environment (XSEDE), which is supported by National Science Foundation grant number ACI-1548562.

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