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# Characterization of ion beams from solid targets driven by a 0.5 kJ short-pulse laser

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Energetic particles, including electrons, ions and secondary particles, are produced by directing an intense laser pulse at a target material. The laser-driven ion beam may find applications in inertial fusion or high-resolution images of both static and dynamic objects in next-generation radiography to probe materials and plasmas in extreme environments. To scale up ion beam production suitable for these applications, we have conducted experiments using a 0.5kJ sub-ps laser at the Omega-EP laser facility to characterize the laser-driven ion beam from a variety of solid targets, including CH/CD/Kapton sub-micron thin films, low-density CD foams and flat CH foil targets of micron-scale thickness, encompassing ion acceleration regimes including Target Normal Sheath Acceleration (TNSA), Radiation Pressure Acceleration (RPA) or Collisionless Shock Acceleration (CSA), and Relativistic Transparency (RT). Ion acceleration with/without Compound Parabolic Concentrator (CPC) cone have also been compared. We obtained beam spectra and spatial source profiles, and found that ~700-800nm foil target achieved the best ion yield among the targets tested. Preliminary static and dynamic radiography were also conducted using these laser-driven ion beams. The different characteristics of the ion beams produced from these targets will be summarized and compared with simulations of preplasma formation and main pulse interaction with the target, and understandings/scaling from the literature.

## Working group

WG2 : Laser-driven plasma acceleration of ions

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