Contribution ID: **170** Type: **talk**

Exploring Energy Absorption in Ultra-Thin Targets

Wednesday, 27 September 2017 16:40 (20 minutes)

Ion acceleration in thin targets can occur through several different mechanisms such as relativistic transparency and radiation pressure acceleration. The acceleration regimes are distinguishable through the structure of the ion beams produced as well as the level of laser energy absorption.
We present data from a recent experiment conducted using ultra-thin targets on the Astra-Gemini laser. Energy absorption into these thin foils was investigated as well as the spatial profile of the transmitted light. Targets of thickness 2 –100nm showed variation in the reflected and transmitted light, allowing for the level of energy absorption and the consequential effect on ion energies and flux to be studied. Structure in the spatial profiles of the thin targets also show signatures of the relativistic transparency regime.

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Session Classification: WG2_Parallel

Track Classification: WG2 - Ion Beams from Plasmas