Recent energy transport experiments on the VULCAN Petawatt laser

KATE LANCASTER, STFC Rutherford Appleton Laboratory — VULCAN Petawatt experiments have been performed to investigate aspects of energy transport in solid targets. A range of targets were used to study the transport in insulating \( \text{SiO}_2 \) and conducting \( \text{Al} \) materials of similar \( Z \), and low \( Z \) materials. Thick \( \text{SiO}_2 \), \( \text{Al} \), and \( \text{CH} \) targets with copper coated on the rear surface were designed to yield information about energy transport in larger targets of different material properties. Data were obtained from x-ray and optical imaging systems. Unusual patterns in the expansion profiles were observed consistently for the \( \text{Al} \) case compared with the other target materials. Buried Nickel layers were sandwiched between the thin (2-5\( \mu \)m) target materials (\( \text{Al}, \text{SiO}_2,\text{CH} \)) to enable measurement of the Ni Lyman Alpha thermal emission using a spherical crystal imaging system. Data were also obtained from the other x-ray and optical imaging systems. Modeling using hybrid, radiation hydrodynamic, and atomic codes is presented to assist interpretation of the data.