

ABSTRACT

A high intensity laser pulse incident on an overdense plasma generates high energy electrons at the critical surface which propagate into the plasma. The details of this propagation are critical to the fast ignition process. The energetic electrons emerge as a jet on the far side, but the spread and propagation direction of the jet within the plasma is not well known. By embedding several thin high-Z layers in a CH film, one can directly image the progress of the electron beam. It loses enough energy to heat the medium through which it travels to hundreds of electron volts. At that temperature, a gold film buried under CH emits sufficiently hard thermal x-rays to allow imaging the heated area with an x-ray pinhole camera. The film can be thin enough to also see the emissions from another layer near the front of the film. If these two images are visible simultaneously, one can measure the beam spread and propagation direction within the plastic.