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Emission spectroscopy as a tool in determining the time evolution of mix in ICF implosion experiments MARK GUNDERSON, DONALD HAYNES JR, DOUGLAS WILSON, GEORGE KYRALA, Los Alamos National Laboratory — A good understanding of the time-dependent evolution of mix is vitally important in the design of ICF implosion and ignition capsules, and emission spectroscopy is an important experimental tool in probing our level of understanding of mix in such systems. By applying a layer of Ti-doped plastic at the pusher-fuel interface that is sufficiently thin (0.1 microns) to be completely mixed into the fuel, we can gain invaluable time-resolved Ti spectral line data indicative of pusher mix into the hot fuel core. Specifically, as the Ti reaches the hot 3 – 4 keV core of the fuel, a sufficient population of hydrogen-like Ti will be created to result in strong Ti Lyman-alpha emission. From the change in the intensity of this line as a function of time, we can back out the timing and the amount of pusher mix reaching the fuel core. This spectroscopic data in conjunction with neutron and proton yield data and gated imaging data provide an invaluable database that can be used to test and benchmark mix models incorporated into radiation hydrodynamic simulation codes.

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