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Progress in using imaging x-ray spectroscopy to diagnose interspecies ion separation in inertial confinement fusion experiments TIRTHA JOSHI, PETER HAKEL, SCOTT HSU, NELSON HOFFMAN, YONGHO KIM, HANS HERRMANN, GRIGORY KAGAN, Los Alamos National Laboratory, ROBERTO MANCINI, University of Nevada, Reno — We discuss the reconstruction of spatial profiles of ion densities and plasma conditions based on analyses of spatially resolved x-ray pinhole images of Ar-doped, D₂-filled OMEGA direct-drive ICF implosions. The targets are 15- μ m spherical plastic shells filled with varying D₂-Ar relative and total gas pressures. Ar K-shell spectral features are observed primarily between the time of first-shock convergence and slightly before neutron bang time, using a time- and space-integrated spectrometer (XRS2), streaked crystal spectrometer (SSCA), and up to three gated multi-monochromatic X-ray imagers (MMI) fielded along three different lines of sight. Uncertainties and validation of our analysis method using synthetic data are discussed. We report preliminary analysis of data from the IonSepMMI-17A OMEGA campaign, which adds a third MMI and aims for more-symmetric implosions than our prior campaign [1, 2]. Anticipated results are improved observations of strong and weak interspecies-ion-separation depending on the target fill. [1] S. C. Hsu et al, EPL **115**, 65001 (2016). [2] T. Joshi et al., PoP **24**, 056305 (2017). LA-UR-17-25780

Tirtha Joshi
Los Alamos National Laboratory

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