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Synthetic Spectra for Krypton Filled/Germanium Doped Pipes as a Laser Driven K-shell Source[1] JOHN GIULIANI, NICHOLAS OUART, ARATI DASGUPTA, Naval Research Laboratory, KEVIN FOURNIER, Lawrence Livermore National Laboratory, JOHN APRUZESE, Engility Corp., ROBERT CLARK, Berkeley Research Assoc. — Recent results from Kr filled pipes on the National Ignition Facility have demonstrated 1.6 kJ/sr of Kr K-shell, or 20 kJ into 4*pi [1]. The observed Kr He-alpha and Ly-alpha lines indicate a temperature of 6 - 8 keV, but the strong underlying continuum emission is characterized by a significantly lower temperature ($\sim$ 1keV). Using radiation-hydrodynamic modeling we consider a similar target but with a germanium dopant on the inside of the epoxy pipe. After partial absorption of the laser energy by the Kr fill, the remaining energy in the beam is deposited onto the inner pipe wall. The resultant inward ablation leads to a structured, multi-component plasma. Radially resolved spectra are calculated for various density and temperature profiles of the Ge/Kr mix within the target. The Ge K-shell line emission is between 10 keV and its cold K-edge absorption at 11.1 keV. The He-alpha line of Kr is at 13.1 keV. The objective is to develop a diagnostic for the strong continuum observed in [1]. If this feature arises from a cold envelope surrounding the Kr hot spot, then the Ge K-shell lines may enable measurement of its radial extent and temperature.

[1] K.B. Fournier, M. J. May, J.D. Colvin, et al., Phys. Rev. E, 88, 033104, 2013.

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