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Predictions of secondary reactions, areal densities and hot-spot radii for Omega capsule implosions[1] M.J. SCHMITT, H.W. HERRMANN, Y.H. KIM, N.S. KRASHENINNIKOVA, Los Alamos Natl Lab, S.M. SEPKE, Lawrence Livermore Natl Lab — The radial density profile of an imploding capsule at the time of fusion burn is an important factor in determining the characteristics of the imploded shell and the conditions in the hot burning core. We have simulated a set of deuterium-filled Hoppe glass (SiO_2) capsule implosions using Hydra and predicted the fraction of secondary protons (^{3}He+D→p[14.7MeV]+^{4}He) and neutrons (T+D→n[14.1MeV]+^{4}He) that are generated. The importance of using the downshift of secondary reaction protons for diagnosing capsule areal density is well known. We show how the conversion efficiency changes with variations to the capsule gas fill. A strong correlation between the downshift of the secondary protons with respect to the areal density of the shell, i.e. the ρR, at the time of peak burn is predicted. Predictions for primary and secondary yield variations for alternate gas fills including binary mixtures of H_2, D_2, ^{3}He and ^{4}He also will be shown. Synthetic self-emission diagnosis of the implosion trajectory will be compared to the radial temperature profile to assess the accuracy of hot spot measurement at the time of nuclear burn. The variation in the temporal burn profile, including the variation of three burn peak components will be discussed.

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