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Capsule design for charged-particle stopping power measurements using simultaneous gamma-ray, particle, and x-ray observations of implosions[1] NELSON HOFFMAN, HANS HERRMANN, YONGHO KIM, LANL — We plan to measure the stopping power $\Delta E/\rho\Delta x$ of nonthermal charged particles in ICF plasmas, using an imploded capsule containing DT^{3}He. We will measure (1) ablator areal density $\rho\Delta x$ *via* ^{12}C(n,n'γ) gamma-ray detection, using the Gamma Reaction History diagnostic, where the gamma rays are generated by 14.1-MeV DT neutrons; and (2) proton energy downshift ΔE *via* spectrometry of 14.7-MeV D^{3}He protons, through collaboration with the MIT PSFC group. To measure $\Delta E/\rho\Delta x$ with a given accuracy imposes requirements on the accuracy of the separate measurements of ΔE and $\rho\Delta x$, and in turn on the yields of DT and D^{3}He reactions and $\rho\Delta x$ of the capsule. Other requirements include optimizing the shell to have shallow gradients of temperature T_e and density n_e so that most of the particle slowing occurs at well defined conditions. Further major necessities are: the ability to diagnose T_e and n_e in the shell *via* x-ray spectra; and minimizing shell perturbation growth and anisotropy of particle emission.

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