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Effects of Asymmetries on the Evolution of an Indirectly Driven ICF Capsule Outer Shell CALVIN YOUNG, Los Alamos National Lab/ Univ. of Missouri Columbia, ERIC LOOMIS, PAUL KEITER, Los Alamos National Lab, P-24, TANA CARDENAS, Los Alamos National Lab, MST-7, CASEY KONG, General Atomics, JACOB MCFARLAND, Univ. of Missouri Columbia — Nuclear fusion offers clean power production in a compact form, and as such is a focus of many avenues of research. Inertial Confinement Fusion (ICF) is particularly promising, though many hurdles remain in the attainment of fusion experimentally. ICF methods involve imploding a spherical capsule composed of hydrogen fuel sheathed in layer(s) of specially selected materials. The implosion is driven indirectly by bathing the capsule in laser driven x-rays. The ionized outer shell is forced inwards by ablative force, compressing the inner layers as a piston, until the fuel reaches an energy state at which robust burn and fusion reactions occur. Fabrication of the shell is difficult, and the form is an imperfect spheroid. Imperfections lead to asymmetrical evolution as the outer shell implodes, introducing instabilities which reduce compressive efficiency. It is necessary to be able to characterize the shape of the outer shell, to predict with simulations the effect of surface features on evolution during implosion. In this presentation I discuss the development of a tool which reads manufacturer profile data of the capsule surface and returns orientation and spherical harmonics. This data was then used to determine the evolution of features during initial implosion stages using an ablative rocket model. Results from these calculations can be used to calculate growth factors for instabilities such as the ablative Rayleigh-Taylor.

Calvin Young
Los Alamos National Lab/ Univ. of Missouri Columbia

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