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Demonstrations of foam shell and infrared heating methods for FIREX targets

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We study fuel layering for Fast Ignition Realization Experiment (FIREX) cryogenic targets according to two strategies: a foam shell and Infrared (IR) heating. Foam is a porous material and would soak up a liquid fuel uniformly by capillarity. The method has the difficulty to form void-less solid fuel because of the density difference between the liquid and solid phases. We have demonstrated the residual void fraction of ~1 % in a foam wedge. ANSYS simulations have represented that the technique would be applicable to a FIREX target. We examine the simulated process using a dummy foam shell target and succeed to form an ice layer with a reduced void fraction. The IR heating technique has originally been developed for central ignition targets, which requires spherical symmetry. We modify it for an axisymmetric FIREX target. We have developed the dedicated layering system with additional temperature control of the cone. To date, the sphericity of a formed ice layer reaches 95 %.

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