# UNDERSTANDING DT LAYERING FROM A PROCESS ENGINEERING PERSPECTIVE

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Cryogenic layering processes at the National Ignition Facility (NIF) deliver high quality deuterium-tritium (DT) layers meeting roughness and defect specifications 90% of the time within the week leading up to an ignition experiment. Production yield of layers largely depends on the ability to successfully capture a single seed of the proper phase inside the capsule. The presence and number of seed crystals are diagnosed using only the height of the liquid meniscus as measured from three orthogonal X-ray views of the capsule. Effort has been devoted to understanding layer evolution in the spherical capsule geometry and thermal environment, identifying key failure mechanisms, developing in-process diagnostic tools, and identifying and changing process variables that may impact layer outcomes. This work will describe the statistics of the DT layering process, the results of experiments in which key process parameters were adjusted, and the use of process models to understand and simulate layer formation under various conditions.

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