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Simulations of the impact of localized defects on ICF implosions[1]

JOSE MILOVICH, HARRY ROBEY, CHRISTOPHER WEBER, SCOTT SEPKE, DANIEL CLARK, JOE KONING, VLADIMIR SMALYUK, DAVID MARTINEZ, LLNL — Recent experiments [1] have identified the tent membranes that support the capsule as a source of a large azimuthal perturbation at the point of departure from the surface. Highly-resolved 2D simulations have shown that vorticity generated by the interaction of the ablated capsule material and the tent allows for the penetration of cold ablator material into the burning hot-spot likely cooling the central burning plasma. These observations have motivated the search for alternative supporting methods. One of the techniques being considered uses the existing fill-tube (needed to deliver the cryogenic fuel) supported against gravity by a thin rod (cantilever) spanning the hohlraum diameter. Recent experiments have assessed the perturbation induced on the target as the rod is positioned along the fill-tube at different distances from the capsule surface and found optical-depth modulations oriented along the cantilever direction, possibly caused by laser spot shadowing or hydro-coupling. To fully understand the data we have undertaken an extensive study of highly-resolved 2D integrated simulations abled to resolve the 12 um diameter cantilever. Results of our computations and comparison with the experiments will be presented. [1] J. R. Rygg et al, Phys. Rev. Lett. 112, 195001 (2014)

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