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Instability Analysis for Beryllium Ignition Capsules: Graded, Ungraded, and No Doping ROBERT SINGLETON, DOUG WILSON, NELSON HOFFMAN, JOHN GRONDALSKI, Los Alamos National Laboratory — Graded copper doped Beryllium capsules were introduced to dampen hydrodynamic instability growth during ICF ignition. A pure Be design with no doping may provides similar protection against instability growth. We have considered three designs with a uniform copper dopant: the first has 0.9% Cu, the next has 0.3% Cu, and the last is pure Be with no Cu doping. We have chosen the uniform designs so that their corresponding radiation pulses are similar to that of graded dopant designs, thereby allowing for their use in the same hohlraum as a graded dopant capsule. We have compared our capsules with a typical 5-layer graded design, and our uniformly doped designs performed in a similar fashion. Not only does the instability growth of the various capsules depend strongly upon where the initial perturbation has been seeded, but it also depends upon which mode has been dominantly excited. No capsule outperforms any other capsule at all modes. Consequently, the specific designs fielded at NIF will depend critically upon the ignition failure mode, and should be chosen to reduce the mode numbers most closely associated with failure.

Robert Singleton Jr.
Los Alamos National Laboratory

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