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Robustness of the Laser Mégajoule baseline design with graded dopant JEAN GIORLA, DIDIER GALMICHE, LAURENT MASSE, FRANCOISE POGGI, FRANCOIS RENAUD, PATRICIA SEYTOR, Commissariat a lEnergie Atomique, Bruyeres-le-Chatel, France — The Laser Mégajoule facility is under construction near Bordeaux and will deliver up to 2 MJ. The nominal target design has been chosen to provide enough margins towards uncertainties due to laser plasma interaction, radiation asymmetry and hydrodynamic instabilities. The first capsules we studied had uniformly doped plastic ablators, and we have recently begun the study of a plastic ablator with graded Ge dopant. We have estimated the low mode deformations of the DT shell with a linear analysis approach. These deformations are due to the intrinsic x-rays non-uniformity and hydrocoupling, the capsule roughness, and the laser and target 3D-defects. The technological dispersions are taken into account by estimating the final deformation probability distribution with each error sampling according to the specification. 2D-hydrodynamic instability simulations were performed with modes 12 to 120 perturbations at outer ablator interface. The graded dopant drastically lowers the growth factors at DT/CH interface and at the hot spot location. It follows that the graded doped design may support an outer ablator roughness close to 300nm rms(12-120). Sensitivity of hydro instability growth to DT gas density, which depends on the cryogenic temperature, is evaluated with a 1D-mixed model.

Jean Giorla
Commissariat a lEnergie Atomique, Bruyeres-le-Chatel, France

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