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Modelling of perturbations in the surface of a cylindrical imploding rotating cavity.[1] RUBERT MARTIN PARDO, McGill University, DAVID PLANT, General Fusion, JOVAN NEDIC, McGill University, GENERAL FUSION COLLABORATION — A cylindrical cavity is formed by rotating a liquid to solid body rotation resulting in a cylindrical liquid shell surrounding a gas-filled cavity. As this cavity is radially collapsed by pushing the fluid through a honeycomb mesh, perturbations begin to form on the interface. The dynamics of this perturbation can be well modelled by a second-order ODE and, as such, the initial velocity and amplitude of the perturbation have a decisive role on the ulterior behavior of the roughness of the surface during the implosion. It will be shown how this initial perturbation, in turn, depends on different control parameters, namely the driving pressure profile, the rotation rate of the system, the initial liquid depth and the mesh geometry. A model is developed to account for this relation. The cavity surface was measured using high-speed videography and surface tracking digital techniques for a range of values of the control parameters sufficient to capture the change from a rough cavity surface to a smooth interface.

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