Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

An Update on Experiments and Simulations of Rayleigh-Taylor Instability in Elastic-Plastic Solids PAMELA ROACH, ARINDAM BANERJEE, Missouri S&T — When an elastic-plastic plate is accelerated by a fluid of lower density, Rayleigh-Taylor instability (RTI) instability is mitigated by the mechanical strength of the plate. Such instances of RTI is observed in explosive welding, volcanic island formation, and inertial confinement fusion. In contrast to Newtonian fluids, experimental study of RTI in accelerated solids is traditionally hindered by difficult to measure material properties and exceedingly small time scales. Both experiments and simulations are used to define the instability region - moreover, the dependence of RTI on initial conditions in elastic-plastic solids is explored. In the experiment, a horizontally mounted disc is rotated to accelerate the interface between an elastic-plastic solid and air. The instability threshold and perturbation growth rate are captured using backlit imaging and a high speed camera. Two dimensional simulations are performed using finite element model ABAQUS to predict instability for a given initial perturbation and acceleration. Experiment and numerical simulation results are compared to the relevant literature.

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Date submitted: 08 Aug 2011 Electronic form version 1.4