

## **Developing flyer plate impact experiments for shock wave interaction studies**

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The interaction of shock waves with inhomogeneous media is important in many astrophysical phenomena[1]. Modeling these phenomena in the laboratory yields additional information to improve simulations as well as the interpretation of astrophysical observations. Scaled experiments using magnetically accelerated flyer plates impacting on low density foam targets have been proposed for the Z machine at the Sandia National Laboratories[2]. Carrying out such experiments on smaller machines like the Zebra accelerator at the Nevada Terawatt Facility (NTF) would reduce costs significantly and thus enable a broader scan of experimental parameters. At the NTF, we have demonstrated flyer acceleration to velocities of up to 8 km/s; we have also carried out first impact tests with transparent targets and imaged the resulting shock waves with shadowgraphy. Simulations with a 1D Lagrangian hydrodynamical simulation code show that we are able to drive strong shocks over several millimeters. We are currently developing additional diagnostics (VISAR and x-ray backlighting) for our experiments. Once these diagnostics are implemented, we plan to carry out shock interaction experiments with inhomogeneous low-density foam targets.

### **References**

- [1] B.A. Remington et. al., Rev. Mod. Phys., vol. 78, p. 755 (2006)
- [2] R.P. Drake, Phys. Plasmas, vol. 9, p. 3545 (2002)