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Two-dimensional Imaging Velocity Interferometry of laser shock driven Si RAYMOND SMITH, Lawrence Livermore National Laboratory, CYNTHIA BOLME, Los Alamos National Laboratory, DAVID ERSKINE, PETER CELLIERS, JON EGGERT, GILBERT COLLINS, Lawrence Livermore National Laboratory — We present results of 1D and 2D velocimetry measurements of shock compressed Si conducted on the Janus laser facility at the Lawrence Livermore National Laboratory. A 6ns long laser pulse ablatively shock compresses a 300 micron thick Si [111] single crystal sample. A standard 1D line VISAR technique is then used to record the Si/vaccum or Si/LiF interface velocity histories. Concurrently a 2D velocity interferometry technique records the spatial structure of the deformation at one time during the compression. The 2D interferometer offers 2-micron spatial resolution and ∼10 m/s velocity resolution. Our data show very different spatial and velocity structures with deformation associated with elastic-, plastic- and high pressure phase deformation. The presence of a LiF window is shown to suppress velocity jetting consistent with fracture from the free-surface samples. The data from the high resolution 2D interferometer reveals a richness in surface morphology only hinted at with standard spatially integrating VISAR techniques.

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