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Study of dynamic properties of copper at high-strain rate using Proton Radiography to measure Rayleigh-Taylor instability ROBERT KING, GUILLERMO TERRONES, RUSSELL OLSON, CHRISTOPHER MORRIS, ADAM MONTOYA[1], FESSEHA MARIAM, ALEXANDER SAUNDERS, GEORGE GRAY, Los Alamos National Laboratory — Our research focuses on the understanding of the dynamic behavior at high strain and strain-rates of copper. We have engineered an experimental package that allows systematic study of Rayleigh-Taylor (RT) instability using the Los Alamos National Laboratory Proton Radiography Facility. Polycrystalline grain-size, single-crystal orientation, and strain-hardening affect the yield strength at high strain-rates as assessed through measurements of the unstable RT perturbation growth through time-sequence radiographs and simulated using the PAGOSA hydrocode. Our measurements are being used to validate constitutive models that enable accurate predictions of dynamic deformation processes under high pressure.

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