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Influence of Sample Geometry on Sweeping-Detonation-Wave Spallation in Tantalum GEORGE GRAY III, LARRY HULL, VERONICA LIVESCU, MATT BRIGGS, ROSS MEYER, Los Alamos National Laboratory, LOS ALAMOS NATIONAL LABORATORY TEAM — Widespread research over the past five decades has provided a wealth of experimental data and insight concerning shock hardening and the spallation response of materials subjected to square-topped shock-wave loading profiles. Less quantitative data have been gathered on the effect of direct, in-contact, sweeping-wave high explosive (HE)-driven Taylor wave loading profile shock loading on the shock hardening, damage evolution, or spallation response of materials. Sweeping-wave loading is a significantly different loading history than that achieved by a square-topped impulse or 1-D HE-driven plane-wave shock in terms of the evolving spherical and shear stresses applied to the specimen. The goal of this research is to quantify the combined influence of shockwave obliquity evolution plus sample geometry on the spallation response of Tantalum(Ta) by subjecting a curved Ta plate to HE-driven sweeping detonation-wave loading and quantify both the wave propagation and the post-mortem damage evolution. This talk will summarize our current understanding of the similarity and differences between the shock hardening and damage evolution during sweeping detonation-wave spallation loading observed in flat and curved Ta plate samples.

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