

Abstract Submitted
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Non-Modal Stability Analysis of High Strain-Rate Plastic Shear Flow ALI NASSIRI, GREGORY CHINI, BRAD KINSEY, University of New Hampshire — High-speed oblique impact of two metal plates results in the development of an intense shear region at their interface, which leads to interfacial profile distortion and interatomic bonding. If the relative velocity is sufficient, a wavy pattern with a well-defined wavelength and amplitude is observed. The wavy structure has similarities to shear instabilities observed in fluid dynamics and predicted by hydrodynamic stability theories. However, since the impact is a short-time transient dynamical phenomenon, non-modal stability analysis presumably is more relevant than conventional eigenvalue analysis. Here, a non-modal shear flow stability analysis of a perfectly plastic material is performed to investigate the transient growth of disturbances and to assess if a connection exists with the corresponding predictions obtained from modal analysis.

Ali Nassiri
University of New Hampshire

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