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Uncertainty Quantification of the Reverse Taylor Impact Test and Localized Asynchronous Space-Time Algorithm[1] WAAD SUBBER, ALBERTO SALVADORI, SANGMIN LEE, KAREL MATOUS, University of Notre Dame — The reverse Taylor impact is a common experiment to investigate the dynamical response of materials at high strain rates. To better understand the physical phenomena and to provide a platform for code validation and Uncertainty Quantification (UQ), a co-designed simulation and experimental paradigm is investigated. For validation under uncertainty, quantities of interest (QOIs) within subregions of the computational domain are introduced. For such simulations where regions of interest can be identified, the computational cost for UQ can be reduced by confining the random variability within these regions of interest. This observation inspired us to develop an asynchronous space and time computational algorithm with localized UQ. In the region of interest, the high resolution space and time discretization schemes are used for a stochastic model. Apart from the region of interest, low spatial and temporal resolutions are allowed for a stochastic model with low dimensional representation of uncertainty. The model is exercised on the linear elastodynamics and shows a potential in reducing the UQ computational cost. Although, we consider wave prorogation in solid, the proposed framework is general and can be used for fluid flow problems as well.

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