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Laminar, cellular, transverse, and turbulent detonations in condensed phase energetic materials from molecular dynamics simulations AARON LANDERVILLE, VASILY ZHAKHOVSKY, MIKALAI BUDZEVICH, University of South Florida, CARTER WHITE, Naval Research Laboratory, IVAN OLEYNIK, University of South Florida — The development of instabilities in condensed phase detonation is simulated using moving window molecular dynamics and a generic AB model of a high explosive. An initially planar detonation front with one-dimensional flow becomes unstable through the development of transverse perturbations. Highly inhomogeneous and complex two-dimensional cellular and transverse, and three-dimensional turbulent detonation structures were observed depending on the physico-chemical properties of the AB energetic material, sample geometry, and boundary conditions. The different regimes of condensed-phase detonation simulated by a moving window molecular dynamics technique exhibit structures, although at a much smaller scale, similar to those observed in gases and diluted liquids.

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