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Cellular Structure and Oscillating Behavior of PBX Detonations<sup>1</sup> IGOR PLAKSIN, LUIS RODRIGUES, RICARDO MENDES, University of Coimbra, ADAI/LEDAP, SVYATOSLAV PLAKSIN, CLAUDIA FERREIRA, ED-UARDO FERNANDES, University of Coimbra, ADAI — Efforts are aimed on experimental study of reaction localization/instabilities manifested in detonation reaction zone (DRZ) of PBXs at micro-, meso- and macro-scale. At micro- and mesoscale levels, leading role of kinetic nonequilibrium in reaction localizations onset was established in experiments with single beta-HMX crystals-in-binder subjected to 20 GPa-shock and PBX detonation. Reaction localizations and further ejecta formation were spatially resolved by 96-channel optical analyzer at simultaneous recording reaction light and stress field around crystal. Spatially resolved measurements reveal fundamental role of shear-strain in triggering initiation chemistry. At macro-scale level, formation of the cell-structures and oscillating detonation regimes revealed in HMX- and RDX-based PBXs at wide variation of grain-sizes, wt. % filler/binder, residual micro-voids and binder nature. Emphasizes placed on effect of DRZ-induced radiation upon oscillating regimes of detonation front motion.

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