Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Numerical Study of Detonation Expansion from a Small Channel to a Large One MILTIADIS PAPALEXANDRIS, CHRISTIAN JACOBS, JEAN-FRANCOIS THOMAS, VINCENT DELEDICQUE, Universite catholique de Louvain, DEPARTMENT OF MECHANICAL ENGINEERING TEAM — This presentation reports on numerical results for the evolution of a detonation wave that is expanded from a small channel to a larger one. In accordance with experimental data, the simulations predict three different types of evolution, supercritical, critical and subcritical ones. In a supercritical detonation, the reaction zone remains always attached to the precursor shock. A critical detonation is characterized by temporary extinction and reinitiation at later times. In a subcritical detonation, the extinction is permanent, i.e., there is a permanent decoupling of the reaction zone from the leading front. The presentation concludes with a parametric study on the effects of the activation energy of the fuel and the channel-width ratio.

Miltiadis Papalexandris
Universite catholique de Louvain

Date submitted: 22 Sep 2005 Electronic form version 1.4