

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Curvature effects on detonations with mole decrement reactions

VIKTOR GORCHKOV, MARK SHORT, TAM, UIUC — We analyze the structure and stability of weakly curved, quasi-steady, self-sustaining detonations having a one-step, non mole-reserving chemical reaction. For a steady planar detonation, a sufficiently large mole decrease during the reaction causes the rate of heat release by chemical reaction to reach a maximum at a point of incomplete reaction. It is this feature which allows the construction of quasi-steady, weakly curved, converging detonation solutions, in addition to the previously identified diverging wave solutions. We construct the quasi-steady detonation velocity against front curvature relationships for converging waves with mole-decrement reactions. The stability of such solutions is investigated by direct numerical simulation of the imploding detonations

Dmitri Pushkin
TAM, UIUC

Date submitted: 12 Aug 2005

Electronic form version 1.4