Abstract Submitted
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Numerical Simulations of Detonation Wave - Magnetic Field Interactions[1] LORD COLE, ANN KARAGOZIAN, University of California, Los Angeles — Numerical simulations of one- and two-dimensional detonation waves subjected to an applied magnetic field are performed, with applications to flow control and MHD thrust augmentation in Pulse Detonation Engines and their design variations.[2] The evolution of the ionization processes and the diffusive and convective transport of the magnetic field are examined in the context of their effect on detonation dynamics. As with prior studies on hydrogen-air detonation dynamics,[3] the present studies explore hydrogen-air-cesium detonations via high order shock capturing schemes and complex reaction kinetics, in addition to a two-temperature relaxation model for the plasma. One-dimensional simulations examining the non-coupled effect of the magnetic field on the unsteady detonation indicate that the stabilizing effect of the dilluent, cesium, becomes less effective when it becomes an active participant under the influence of strong magnetic fields. Two-dimensional dynamics allow a more complete coupling between the magnetic field and the detonation kinetics to be represented, with implications for an alteration in stability characteristics.

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[2]Zeineh, et al., **J. Prop. & Power**, Vol. 28, No. 1, pp. 146-159, 2012
[3]Cole, et al., **Comb. Sci. & Tech.**, to appear, 2012

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