IOWA STATE UNIVERSITY
Department of Mechanical Engineering

Spectroscopic Investigation of Strong Shocks from High Explosive Detonation

Nick Glumac
Mechanical Science & Engineering
University of Illinois

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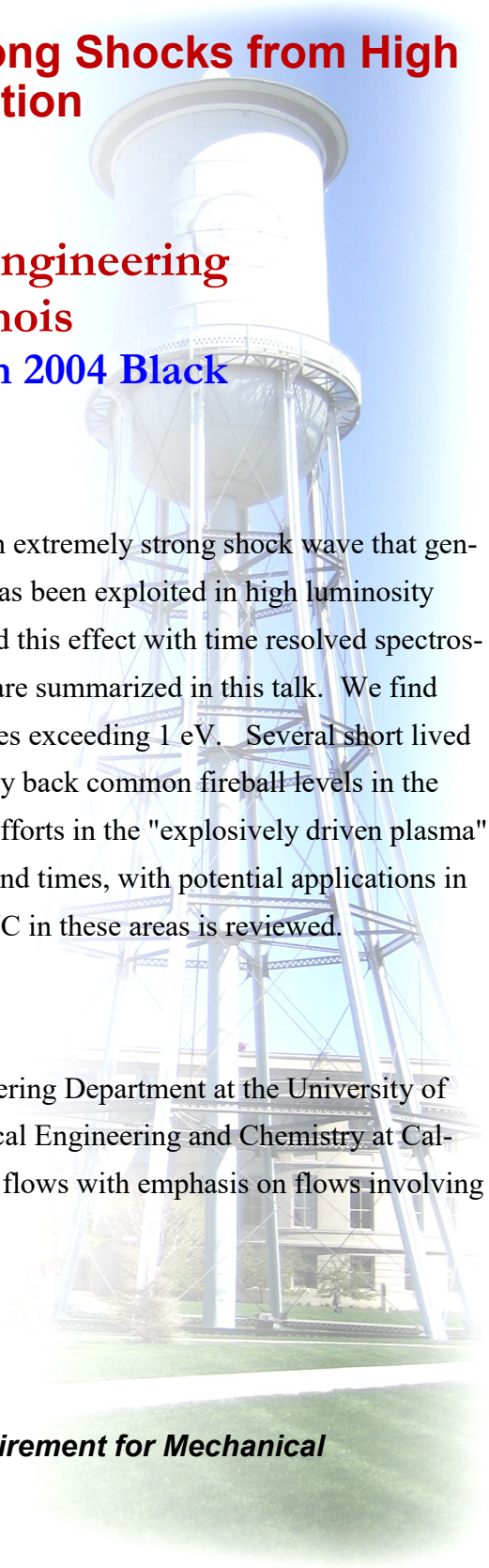

Abstract

Breakout of high explosive detonations into air media produce an extremely strong shock wave that generates a short duration pulse of high intensity light. This effect has been exploited in high luminosity lighting but remains poorly understood. Our lab has investigated this effect with time resolved spectroscopy for a number of years now, and the results of these studies are summarized in this talk. We find plasma conditions exist for a few microseconds, with temperatures exceeding 1 eV. Several short lived intermediate species are observed, and temperatures rapidly decay back common fireball levels in the 2000 - 3000 K range. The phenomenon has led to engineering efforts in the "explosively driven plasma" field where these effects can be sustained over longer distances and times, with potential applications in new ordnance design and ordnance disposal. Initial work at UIUC in these areas is reviewed.

Biography

Nick Glumac is a professor in the Mechanical Science & Engineering Department at the University of Illinois at Urbana-Champaign. He received his PhD in Mechanical Engineering and Chemistry at Caltech in 1994. His research focusses on spectroscopy of reacting flows with emphasis on flows involving energetic materials, especially explosives.

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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