

Abstract Submitted  
for the SHOCK07 Meeting of  
The American Physical Society

**Reaction Zone Structure of Steady-State Detonation Wave for Tetranitromethane**<sup>1</sup> ALEXANDER UTKIN, VALENTINA MOCHALOVA, VICTOR GARANIN, Institute of Problems of Chemical Physics RAS — The investigation of the reaction zone structure at steady-state detonation in liquid TNM by means of laser interferometer VISAR was conducted. The initial density and detonation velocity of TNM were 1.64 g/cm<sup>3</sup> and 6.4 km/s respectively. Laser beam reflected from Al foil with thickness 7-400 mkm placed between the charge and water window. Velocity profiles with Von Neumann spike were determined. The transition from the reaction zone to unloading wave is smooth and it doesn't allow to define correctly the parameters of Chapman-Jouguet point. Approximate reaction time is 300 ns, and pressure in Von Neumann spike (26,4 GPa) exceeds the pressure in Chapman-Jouguet point (14,5 GPa) 1,8 times. Behind the shock jump a maximum gradient of particle velocity is observed which is equal to 10<sup>7</sup> 1/s, it is a typical value for powerful HE. Although TNM has low parameters in Chapman-Jouguet point and a large duration of chemical reaction zone, the high initial decomposition rate provides the existence of steady-state detonation front in tetranitromethane.

<sup>1</sup>The work was supported by ISTC, Project #3394.

Alexander Utkin  
Institute of Problems of Chemical Physics RAS

Date submitted: 21 Feb 2007

Electronic form version 1.4