

# Dynamics of sizes of nanoparticles at trinitrotoluene detonation on the VEPP-4M synchrotron radiation

**Rubtsov I A<sup>1,2,®</sup>, Ten K A<sup>1</sup>, Pruel E R<sup>1,2</sup> and Kashkarov A O<sup>1,2</sup>**

<sup>1</sup> Lavrentyev Institute of Hydrodynamics of the Siberian Branch of the Russian Academy of Sciences, Lavrentyev Avenue 15, Novosibirsk 630090, Russia

<sup>2</sup> Novosibirsk State University, Pirogova Street 2, Novosibirsk 630090, Russia

® rubtsov314@mail.ru

Registration of small angle x-ray scattering (SAXS) during detonation of high explosives (HE) allows to measure fluctuation of density in a zone of chemical reaction. In the case of oxygen-deficient HEs it is connected with synthesis of condensed carbon phases—ultradisperse diamonds (UDD) or graphite.

In this work we carried out SAXS measurement during trinitrotoluene (TNT) detonation. SAXS simulation with real spectrum (the viggler radiation, TNT absorption, absorption of the DIMEX-3 detector) was performed. Comparison of calculated and measured SAXS distribution allows to obtain dynamics of average sizes of nanodiamonds behind the detonation front using pink SR beam.

Experiments with using SR were made on SYRAFEEMA (Synchrotron Radiation Facility for Exploring Energetic Materials) station at the accelerating complex VEPP-4M (Budker Institute of Nuclear Physics). This new station allows to increase the mass of the studied charges by 10 times to 200 grams in comparison with similar station “Extreme states of matter” at the accelerating complex VEPP-3.