

Structure of the detonation front of triaminotrinitrobenzene

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The structure of the detonation front (pressure and density distribution) is measured by various methods. The most common are laser methods, which have good time resolution. Each method has its pros and cons. Despite the variety of methods, measuring the structure of the front remains a difficult task.

A DIMEX detector with a spatial resolution of 0.1 mm is used to measure the density distribution using synchrotron radiation at the Extreme State of Matter station. However, the measurement accuracy is limited by the curvature of the front. To measure the sphericity of the detonation front, a 1D detector oriented transversely to the movement of the front can be used with a time resolution of no more than 25 ns, which is possible on a SKIF.

The proposed method uses a photoregistrator to measure the shape of the detonation front in the photoregulation mode. Knowing the shape of the front (assuming cylindrical symmetry), it can be divided into 0.1 mm layers and the X-ray shadow can be calculated on the DIMEX detector. By comparing the measured data with the calculated data, the density of the explosion products is restored.