

# Detection ejection of particles from the roughness of the shock-loaded metals with using synchrotron radiation

**Ten K A<sup>1,5,@</sup>, Pruel E R<sup>1,5</sup>, Kashkarov A O<sup>1,5</sup>,  
Rubtsov I A<sup>5,1</sup>, Antipov M V<sup>2</sup>, Georgievskaya A B<sup>2</sup>,  
Mikhaylov A L<sup>2</sup>, Spirin I A<sup>2</sup>, Zhulanov V V<sup>3</sup>,  
Shekhtman L I<sup>3</sup> and Tolochko B P<sup>4</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> Federal State Unitary Enterprise “Russian Federal Nuclear Center—All-Russian Research Institute of Experimental Physics”, Mira Avenue 37, Sarov, Nizhniy Novgorod Region 607188, Russia

<sup>3</sup> Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences, Lavrentyev Avenue 11, Novosibirsk 630090, Russia

<sup>4</sup> Institute of Solid State Chemistry and Mechanochemistry of the Siberian Branch of the Russian Academy of Sciences, Kutateladze 18, Novosibirsk 630128, Russia

<sup>5</sup> Novosibirsk State University, Pirogova Street 2, Novosibirsk 630090, Russia

@ ten@hydro.nsc.ru

When a strong shock wave leaves a free surface of the metals, the flows of microparticles are ejections from the surface. The number and size of particles depends on the type of metal, purity of surface treatment, shape of the incident wave, and many other factors. Most experimental studies aimed at studying the ejection of particles from the shape and size of discontinuities (notches, grooves) on the surface of metals. In this work, we detection the particle flow from a free surface of metals with the help of synchrotron radiation (SR) from the colliders VEPP-3 and VEPP-4 in the Budker Institute of Nuclear Physics (Novosibirsk). We investigated the fluxes of micro-particles from the grooves formed on the surface of copper and tin. In some experiments, the visualization of the flow of microparticles with using SR combined with the testimony of piezoelectric sensors. The resulting distribution of masses along the flow of the microparticles are in good agreement with the calculations performed in VNIIEF.