

SPH modelling of ejecta from shock-loaded samples

Rublev G. D.^{1,®}, Dyachkov S. A.¹ and Rogozkin D. B.¹

¹ Dukhov Research Institute of Automatics (VNIIA), Sushchevskaya 22, Moscow, 127055, None

® rublev_gd_97@vk.com

Mechanical processing of materials results in regular perturbations of the micrometer-sized surface. If the surface inhomogeneities are filled with particles, particle ejection and formation of microscopic cumulative jets are observed on such a surface under shock loading. This is a difficult task to study the spatial and temporal evolution under experimental conditions. It is also difficult to describe analytically because of the nonlinearity that occurs with intense impacts and large perturbations. On the other hand, details of jet formation can be obtained by hydrodynamic modeling. This problem is investigated in [1, 2].

The contact smoothed particle hydrodynamics (CSPH) method with MUSCL-type reconstruction of physical values at interparticle contacts is used for modeling. To increase accuracy the TKC method [3] is used.

Modeling of corundum particles ejection from the surface of an impact-loaded steel sample with a rough surface is performed.

- [1] Egorova M S, Dyachkov S A, Parshikov A N, Zhakhovsky V V, Serezhkin A A, Menshov I S, Rogozkin D B and Kuratov S E 2017 *IOP Conf. Series: Journal of Physics: Conf. Series*
- [2] Andriyash A V, Ismailov S M, Kamenev V G, Kaplukov G V, Kondratev A N, Kubasov P V, Kuratov S E, Rogozkin D B, Tikhov A A, Tur I V, Shubin A S, Shubin S A and Yaroschuk P N 2022 *Journal of Applied Physics* **132** 123103
- [3] Rublev G, Parshikov A and Dyachkov S 2025 *Applied Mathematics and Computation* **488** 129128