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3D computer modeling of high-velocity impact phenomena VADIM KIM, IGOR LOMONOSOV, ALEXEY MATVEICHEV, AFANASY OS-TRIK, Institute for Problems of Chemical Physics — The modified "individual particles" method has been developed for solving the system of gas dynamic equations in 3D setup. The continuous media in this approach is represented as an ensemble of finite-size particles, which carry all flow parameters. The special algorithm for splitting and merging of particles belonging to the same eulerian cell has been developed. It made it possible to solve common for PIC-type methods problems with the memory loading and unphysical oscillations. The computation procedure in the modified "individual particles" method performs calculations with the only one particle per cell, while splitting particles are smoothly redistributed in the rarefaction regions. Physical models library includes advanced equations of state for 150 structural materials (metals, alloys, polymers, composites, rocks and minerals), and constitutive relations. We present results of numerical modeling of hypervelocity impact process in 3D setup. The calculations were carried out for different initial velocities and shapes of impactor. Also the materials of impactor and target were varied. The comparison of the results of simulations with experimental X-ray photographs has been done.

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