



Disruption of small asteroids by collision.

O. Nekhaeva (1,2), A. Kiselev (2), I. Nemtchinov (1), O. Popova (1)

(1) Institute for Dynamics of Geospheres RAS, Moscow, Russia, (2) Moscow State University, Moscow, Russia

Observations of atmospheric entry of meter-sized meteoroids into the atmosphere demonstrate that these objects have rather low strength. The collisional history of these bodies (or their parent bodies) may be one of the reasons. To investigate the structure of rather small cosmic bodies after impacts we have carried out 2D simulations of the impacts onto targets in the strength dominated regime not taking into account the gravity forces.

The material was assumed to be a Maxwell-type thermo-visco-elastic substance. Irreversible deformation and microdestruction are modeled. Tensor parameter of damage is introduced in order to describe appearance and evolution of microdamage. Entropy criterion of limit specific dissipation is used as criterion of macrofracture beginning. This task is solved by numerical modeling on Lagrangian mesh.

The velocity of impact was varied. The target and impactor were assumed to consist of identical material. Large spallation zones are formed. Damage may appear across the whole target. The influence of the obtained damage structure on the strength of the body during its atmospheric entry is discussed.