Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Formation, instability and fragmentation of shock-produced jets VASILY ZHAKHOVSKY, SERGEY DYACHKOV, Dukhov Research Institute of Automatics, Moscow 127055, Russia, NAIL INOGAMOV, Landau Institute for Theoretical Physics, Chernogolovka 142432, Russia — Formation and evolution of shock-induced ejecta from metal surface are studied by molecular dynamics and smoothed particle hydrodynamics methods. Simulation of ejecta was divided onto two parts: the short-time formation of jet until it reaches its final mass and the long-time evolution of jet towards its fragmentation. The second part utilizes the mass and velocity distributions obtained at the end of the first part of simulation. MD simulation results for liquid jets of tin with different surface tensions, obtained using two EAM potentials, are presented. We show that fragmentation of ejecta in forms of cylindrical and planar jets happens via different pathways. While the cylindrical jets decay to droplets after reaching a critical length due to Savart–Plateau–Rayleigh instability, the plane jets are stable against the small perturbations of jet shape. We found a more complicated fragmentation mechanism via boundary instability of plane jets.

Vasily Zhakhovsky
Dukhov Research Institute of Automatics, Moscow 127055, Russia

Date submitted: 24 Feb 2017 Electronic form version 1.4