Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Deformation and fracture of bulk metallic glasses under shock loading[1] SVETLANA ATROSHENKO, NIKITA MOROZOV, St. Petersburg State University, JUN SHEN, Harbin Institute of Technology, YURI SUDENKOV, NATALIA NAUMOVA, St. Petersburg State University, SPBSU TEAM, HIT TEAM
— The dynamic behavior of Ti40Zr25Ni3Cu12Be20 ao.% bulk metallic glasses is investigated using plane plates impact technique with duration of ~ 0.5 μs on the base of electric explosive of conductors installation with following parameters: N=6 μf, U up to 50kV, Å up to 7,5 eJ, short circuit duration T=11μs. Velocities of aluminum impactor were in the range of 250–750m/s and controlled using of differential laser interferometer. The elastic characteristics and elastic wave velocities were determined and elastic Young's modulus was calculated using developed optical-acoustic technique. The results show that after dynamic loading microstructure has a lot of shear bands in the form of tree. The grids of shear bands sometimes transform to spall cracks parallel each other. Fracture surface has ductile character with cups fracture. After dynamic loading microstructure has developed spall split. Spallation is realized mainly via rotational micromechanism of deformation and fracture.

[1]Work has been supported by, grants RFBR-08-01-12009, RFBR-NSF-08-01-92201.

Svetlana Atroshenko
St. Petersburg State University

Date submitted: 05 Feb 2009 Electronic form version 1.4