

SPACE DEBRIS SYMPOSIUM (A6)  
Hypervelocity Impacts and Protection (3)

Author: Dr. Wugang Liu

Beijing Institute of Structure and Environmental Engineering(BISE), China, wugangliu@139.com

Prof. baojun pang

Harbin Institute of Technology, China, pangbj@hit.edu.cn

Dr. zengyao han

China Academy of Space Technology (CAST), China, hanzengyao@hotmail.com

DAMAGE IDENTIFICATION OF SINGLE ALUMINUM PLATE PRODUCED BY HYPERVELOCITY  
IMPACT BASED ACOUSTIC EMISSION

**Abstract**

In order to ensure the astronauts' safety and spacecraft normal operation, the design of sensor systems to detect impact impacts on spacecraft become an important problem of spacecraft design. The numerical simulations of acoustic emission (AE) signals produced by projectile hypervelocity impact on Aluminum plate at normal have been carried out using the SPH (smoothed particle hydrodynamics) technique of AUTODYN hydro-codes in this paper. The results using two dimensional simulations are given. In order to separate the characteristics of different wave modes, the AE signals are divided into low frequency and high frequency parts by wavelet time-frequency transform and reconstruction. The results show that the damage condition of the spacecraft can be represented by the amplitudes of the reconstructed the impact signals. The patterns of impact damage can be divided into three types according to the ratio of the second and first low peak amplitude of AE reconstructed signals.