Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Optimum Structure of Whipple Shield against Hypervelocity Impact MINHYUNG LEE, Sejong University — It has been known that the spacecraft protection issues against space debris or meteoroid impact damage are of great importance. Whipple shield structures (double spaced plates) have been investigated and empirical ballistic limit curve (BLCs) are developed. In this paper, we like to investigate an optimum Whipple Shield structure of fixed areal density and space. To do this, a new in-house SPH code has been used. Last 20 years SPH (Smoothed Particle Hydrodynamics) numerical scheme has been widely applied to the hypervelocity impact problems because of the limited velocity range and cost of test. We first examined the extent of debris spreading which seems to be a key factor to the back plate impact. The debris cloud expansion angle shows a maximum value. Then, a series of hypervelocity impact simulations were conducted to predict the critical impacting sphere diameter. It has been found that there is an optimum thickness ratio of front bumper to real wall.

Minhyung Lee
Sejong University

Date submitted: 17 Jan 2013 Electronic form version 1.4