

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

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RECENT PROGRESSES OF MICRO-SPACE DEBRIS HYPERVELOCITY IMPACT TESTS USING
LASER-DRIVEN FLYER TECHNIQUES IN CAST**Abstract**

Laser-driven flyer technique (LDFT) has shown many advantages in simulating space micro-debris hypervelocity impacting effects. In this paper, some recent research progresses of space micro-debris hypervelocity impact tests conducted using LDFT in CAST were detailed introduced, including (1) Hypervelocity impact experiments of space micro-debris on spacecraft surface materials such as K9 glass, ZKS white paint, OSR, Solar cell, etc., were carried out, and the degradation laws of material functional performance were obtained. (2) Micro-debris cumulative impact damage evaluation Model is established. (3) Diamond-like Carbon (DLC) film is proved to be effective to protect the optical materials against space micro-debris impact. (4) Theoretical analysis of flyer velocity is conducted based on Lawrence Model. (5) A new kind of velocity in-situ measurement technology is developed for laser-driven flyer system.

Keywords: Space micro- debris, laser-driven flyer technique, hypervelocity impact effects, spacecraft outer surface materials, cumulative damage evaluation, protection technique against impact