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Aluminum Shield under Hypervelocity Impact of Mylar Flyer up to 10 km/s. JIANHENG ZHAO, California Institute of Technology, FULI TAN, Institute of Fluid Physics,China, C. SUN, C. LIU, Institute of Fluid Physics, G. RAVICHANDRAN, California Institute of Technology — The near-earth space environment is cluttered with man-made debris and naturally occurring meteoroids, which is a big menace to the safety of satellites and spacecrafts. This paper is addressed on the failure response of aluminum shield under milligrame level debris or meteorids with around 10 km/s velocity. A compacted electric gun is employed to accelerate mylar flyer with 8-10 mm diameter up to 10 km/s. The spallation is observed in the rear free surface of 4 mm thick monolithic aluminum shield, and its fracture mechanism changes from plastic to brittle when flyer velocity is above 6 km/s. Once the boundary of aluminum plate is fixed except the loaded area, a through hole with 8mm diameter in the impacted area of the shield is observed after which was impacted by 0.1 mm thick mylar flyer with 6km/s. Three layers of shield is impacted by a myler flyer with velocity up to 10 km/s, debris clouds are observed in the first and the second gaps during the impact process by high speed camera, and its leftover can also be observed on the surface of the third plate.

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