Modeling the fragmentation of hypervelocity impacts on a two wall shield JOSHUA MILLER, ERIC CHRISTIANSEN, NASA Johnson Space Center — Two wall spacecraft shields are a mass efficient method for countering the risk of solid particle environments for systems operating in space. In this approach the threat encounters the first of two walls and shock wave compresses upon impact. The compression heats the materials so that upon subsequent release the materials spread out over a much larger region than the initial threat making it much more likely that a subsequent wall can arrest the impact energy. It is of great importance in system survivability assessments to accurately model this process and to develop models that reasonably describe a broad range of materials and impact conditions. To this end an experimental effort with spherical projectiles of a range of materials has been conducted to greater than 10 km/s and augmented to a much broader range of impact conditions by impact simulations. From this effort a modeling approach has been developed that captures this process for use in survivability assessments. The model and its anchoring data are discussed here.

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