

Abstract Submitted  
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**Small Grains, Hyper Impact: Frontier Science at the DIII-D Tokamak**<sup>1</sup> EVDOKIYA KOSTADINOVA, Baylor University, DMITRI ORLOV, IGOR BYKOV, University of California San Diego, JENS SCHMIDT, Baylor University, University of Stuttgart, GEORG HERDRICH, University of Stuttgart, LORIN MATTHEWS, TRUELL HYDE, Baylor University — This talk reports on a study where material samples are exposed to DIII-D tokamak plasmas with the goal of examining the processes occurring during spacecraft atmospheric re-entries. Due to inherent properties of the tokamak plasma – rotation of the core and edge plasma and fast flow in the scrape-off layer – any object launched radially from the tokamak wall with zero toroidal speed incurs velocity (relative to the plasma) which is comparable to the entry velocity of the Galileo probe to Jupiter. Thus, this project presents a unique opportunity for examining plasma-materials interactions at space-relevant enthalpy and heat fluxes. Here we discuss scaling between laboratory and space conditions, specifics of the experimental design, and calculations of the heat flux and ablation of the material samples. The possibility of heat and particle flux detachment in front of the sample is also explored.

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