

Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Hypervelocity Impacts of Ice Grains into a Titanium Spacecraft Instrument Chamber JAMES D. WALKER, SIDNEY CHOCRON, J. HUNTER WAITE, TIM G. BROCKWELL, Southwest Research Institute — The Cassini spacecraft, currently in orbit around Saturn, has an Ion and Neutral Mass Spectrometer (INMS). There have been some unexpected readings of the instrument in flybys of the moon Enceladus. These flybys range from 7 to 18 km/s, and it has been suggested that ice grain impacts in the instrument could have a velocity-dependent response that influences the materials that the instrument records. To explore the physics of the impacts, computations were performed with CTH. Small ice grains (1 micron across) were impacted into a titanium alloy at a range of speeds of interest. Initial results indicate the formation of a titanium vapor plume begins at impact velocities of 16 km/s. Efforts have been made to quantify the titanium vapor and titanium solid and liquid ejecta at various impact speeds, as all of these may influence chemistry in the instrument's antechamber and thus affect what ions or molecules are seen by the INMS.

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Date submitted: 26 Feb 2013

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