SHOCK05-2005-020032

Abstract for an Invited Paper
for the SHOCK05 Meeting of
the American Physical Society

NASA's Deep Impact: Collision with a Comet

PETER SCHULTZ, Brown University

On July 4, 2005 a unique planetary experiment will be performed: A NASA probe with a mass of ∼360 kg will collide with Comet 9P Tempel 1 at 10.2 km/sec. The collision will be observed with an accompanying flyby spacecraft using two different telescopes and a near-infrared spectrometer. Laboratory experiments at the NASA Ames Vertical Gun (AVGR) have been performed in order to predict what will be seen and the nature of the resulting crater and its ejecta. Because the gravitational acceleration of the comet is only ∼0.04 cm/sec^{2}and the target density as low as 0.2 g/cm^3, this deep space experiment will challenge current understanding of the cratering process. The configuration of the AVGR allows impacts into un-bonded particulates at different angles from the horizontal. Experiments assessed the effect of very low density targets on crater scaling, while high-speed photometers and spectrometers permit probing the temperature and compositional evolution. The presentation will describe the strategies used to get ready for the impact and include the latest released information available from the encounter.