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Numerical Simulation on the Damage Characteristics of Ice Targets by Projectile Hypervelocity Impact WEI ZHANG, GANG WEI, ZHONGCHENG MU, Hypervelocity Impact Center, Harbin Institute of Technology — Interpretation of cratering records on planetary surfaces including the Earth has primarily been concerned with rocky surfaces, most notably the lunar surface and more recently Mars and Venus. Recently, the survey of craters on icy surfaces in the Solar System has been augmented by data from spacecraft close encounters, such as the Galileo mission to the jovian system. To fully understand these cratering records, the physics of hypervelocity impacts needs to be understood. The numerical simulation on the damage characteristics of ice targets by projectile normally hypervelocity impact has been performed using the hydro-code AUTODYN. The 1mm spherical projectile is aluminum 2017 alloy. The targets are water ice. The simulation velocities were in the range of 1km/s-10km/s. The material models are consisted of Tillotson and Polynomial equation of state, Mohr-Coulomb and Johnson-Holmqiust strength model and Johnson-Holmqiust and principle stress failure model. The damage characteristics include peak ejection angle, peak temperature and pressure, maximum crater depth and diameter etc. The simulation results are given and compared with the experimental results of Burchell 2002. The simulation results are consistent very well with the experimental results.

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