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Numerical modeling of Deep Impact experiment V.G. SULTANOV, V.V. KIM, I.V. LOMONOSOV, A.V. SHUTOV, V.E. FORTOV, Inst. Probl. Chem. Phys. RAS — The Deep Impact active space experiment has been done [1,2] to study a hypervelocity collision of a metal impactor with the comet 9P/Temple 1. The modeling of impact on solid or porous ice made it possible to conclude: the form and size of crater depends strongly on the density of comet material; the copper impactor does not melt and remains in the solid state; the temperature of ejecta varies from 5000 K for solid ice to 15000 K for porous ice. The impact on moist water- saturated sand demonstrated different results. In this case, the copper impactor practically does not penetrate the comet surface, melts, destroys and the ricochet process takes place. In the case of moist porous sand the produced crater is stretched in the direction of impact. The analysis of modeling results indicates to the presence of volatile easy-vaporized chemical compounds in the cometary surface. The hypothesis that the cometary surface consists of only ice does not agree with experimental and computational data on the forming and spreading of impact ejecta. [1] http://deepimpact.jpl.nasa.gov/home/index.html [2] M. F. A'Hearn et al, Deep Impact: Excavating Comet Tempel 1 // Science, 2005, v.310, pp. 258-264

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