

An artificial explosive crater on the surface of the comet 9P/Tempel nucleus

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A theoretical model of formation of an artificial explosive crater on the surface of the comet 9P/Tempel 1 is considered. A decision is verified for well explored Arizona crater. Calculations showed that explosion of meteorite inside a target goes on for such depth of submergence where it reaches maximal braking.

The copper impactor of the spacecraft Deep Impact which has mass of 372 kg, successfully collided with the 6-km icy nucleus of short-periodic comet 9P/Tempel 1 at velocity of 10.2 km/s on July 4, 2005. As one of results of collision an artificial impact crater was formed on the surface of the comet Tempel 1 nucleus. Using theoretical model (Opik's model) of collision of the copper impactor with the cometary nucleus the possible crater diameter on the nucleus of comet Tempel 1, formed by the impactor, must be equal from 22 to 57 m and its depth must be equal from 4.8 to 5.6 m. Maximal value of a diameter crater equal to 80 km for $\sigma_p = 1 \text{ êN/m}^2$. Unfortunately the real sizes of artificial crater in the course of the Deep Impact mission was not determined by direct measurements.