

FORMULA OF DEPENDENCE OF CRATER DIAMETER ON COMET NUCLEUS FROM STRENGTH OF ITS MATTER. L. S. Chubko¹, K. I. Churyumov², V. G. Kruchynenko². ¹Kyiv National Aviation University (Cosmonaut Komarov Avenue 1, Kyiv 03058, Ukraine, larisa_ch@inbox.ru), ²Astronomical observatory, Kyiv Shevchenko National University

Opik [1] showed that impact and explosive crater on surfaces of celestial bodies must form as the result of transfer by impactor to target of quantity of movement (impulse), instead of energy. Using this idea we deduced the new empiric formula of the dependence of strength σ_p of superficial layers of the cometary nucleus of comet 9P/Tempel 1 from diameter D of the formed artificial crater:

$$\sigma_p = 5.17 \cdot 10^{20} D^{-4.286}$$

Here σ_p in Kilonewton/meter squared (KN/m^2) and D in cm . On the basis of this formula and our calculations of a diameter of the artificial crater formed on the surface of the nucleus of comet 9P/Tempel (a diameter from 22 to 57 m and a depth from 4.8 to 5.7 m) we think that strength σ_p of superficial layers of the cometary nucleus of comet 9P/Tempel 1 must be 1-100 KPa, but is not 65 Pa = 65 N/m^2 as it is proposed in the work [2].

References: [1] Opik E. J. (1976) *Interplanetary encounters*, New York, Elsevier scient. Publ. Comp., 155 p. [2] A'Hearn M. F., Belton M. J. S., Delamere W. A. et al. (2005) *Science*, 310, 258 - 264.