

New fireball dynamics

V. Stulov (1)

(1) Institute of Mechanics, Moscow Lomonosov State University, Moscow, Russia

Development of methods for determination of meteor and fireball parameters according to observations demands a close attention as divergences of data of the scientific literature, including reference books, are not reduced to discrepancies, and have basic character. In the well known reference book (C.W.Allen. Astrophysical quantities. 1973, University of London) the density of meteoric substance is resulted $\rho = 0.25 \text{ g/cm}^3$; in the same place density of stone and iron meteorites are given $\rho = 3.5 \div 7.8 \text{ g/cm}^3$. In the paper on observations of the Canadian network (Halliday I., Griffin A.A., Blackwell A.T. Meteoritics and Planetary Science. 1996. V. 31. P. 185-217), the double approach to an estimation of meteoric density is shown also.

The reason of serious divergences is the erroneous treatment of a meteoric luminescence. Estimations of extra-atmospheric mass of a meteor on its luminescence and on its braking miss considerably. Approximation of a shone site of a trajectory by rough and exact solutions of the meteoric physics equations with use of data of hypersonic aerodynamics allows to predict correctly properties of meteoric bodies. In particular, the height where meteors go out is calculated precisely enough for a wide range of values of their initial mass.