The outflow speed of the coma of Halley's comet.

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Abstract

Information regarding the outflow speed of the coma of comet Halley has been inferred from various measurements by a number of investigators using different instruments and techniques. The magnitude of the outflow speed and its variation with radial distance in the coma, with heliocentric distance and with the level of the gas production rate, can be accounted for by a new-dimensional steady-state model which is described herein. The model includes the effects of the dusty-gas dynamics in the inner coma and the photochemical heating of the outer coma which is in a state of transition from collision-dominated to free molecular flow. More specifically, the model self-consistently and quantitatively accounts for (1) the radial dependence of the outflow speed from the *in situ* Giotto NMS measurements, (2) the asymmetry in the value of the outflow speed determined from the Kuiper Airborne Observatory IR measurements at 1 AU pre- and post-perihelion, and (3) the heliocentric distance dependence of the Doppler line profile widths of the many radio observations of HCN and OH which cover a range from

perihelion (0.59 AU) to 2.0 AU.

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