

Modelling of Negative Ion Production at Comet P/Halley

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Chaizy et al. (*Nature* 349, 393-396, 1991) have reported on the measurement of negative ions in the inner coma of comet P/Halley by the RPA sensor on board the Giotto spacecraft during its encounter with the comet in 1986. This discovery was a surprise and represents an important addition to our information about atomic processes at comets, but there has been no satisfactory explanation for their existence. We describe here preliminary results of a study to develop a model of negative ion production at Halley. Steady state is assumed, with photodetachment as the primary loss mechanism for the negative ions. Direct electron attachment as well as charge exchange in neutral-neutral collisions have been investigated. The measured neutral gas profile (**Krankowsky et al.**, *Nature* 321,326-329, 1986) was also used in these models. The best fit to the measured negative ion density profile is given by a model involving charge exchange between this neutral gas and fast neutrals generated by charge exchange upstream and flowing back toward the nucleus (**D. Huddleston et al.**, *J. Geophys. Res.*, in press, 1994, and **Eviatar et al.**, *Astrophys. J.* 339, 545, 1989).

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