

## DUST EXPERIMENT FOR A RENDEZVOUS COMETARY MISSION

B.-K. Dalmann, D. Bahr, H. Fechtig, and J. Kissel  
Max-Planck-Institut für Kernphysik, Heidelberg,  
Federal Republic of Germany

During a Rendezvous-type cometary mission it will be possible to collect dust particles on exposed surfaces. A secondary-ion-mass-spectrometer is proposed for the subsequent chemical investigation of such dust collections. An ion gun shoots inert gas or oxygen-ions onto the sample. The energy of these primary ions can be chosen between 1 and 5 keV. The positive and negative secondary ions emitted from the dust surfaces are then analysed with a quadrupole mass filter. The mass range of the instrument will be 1-150 amu. The sensor is able to measure (a) nearly all elements in this mass region, (b) molecules and organic components present in the dust, (c) isotopic ratios of interesting elements. Results of a first series of simulation studies are reported.

### DISCUSSION

*Brownlee*: What is the precision of isotopic measurement in the light of hydride formation and other molecular interferences?

*Fechtig*: There is indeed a problem; particular isotopes could be masked. For example  $^{12}\text{CH}$  on mass 13 masks  $^{13}\text{C}$ . It is possible, however, to vary the energy of the sputter ions. Then  $^{12}\text{CH}$  has different energy patterns compared to  $^{13}\text{C}$ . Thus it is in principle possible to measure these isotopes to a lower accuracy.

*Morfill*: Isotopic resolution of aluminium ( $\text{Al}^{26}$ ) is also of great astrophysical significance. What is the sensitivity of the detector there?

*Fechtig*: As shown in one of the figures, the sensitivity for Al is reasonably good. Taking into account the solar abundance of Al we expect to be able to see it even on samples with <1% dust coverage.