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A new model of the lunar exosphere

J A Whitby (1), P. Wurz (1), U. Rohner (2), H. Lammer (3), C. Kolb (3) and P. Dobnika (4)

(1) Physikalisches Institut, University of Bern (2) Lawrence Livermore National Laboratory (3) Space Research Institute, Austrian Academy of Sciences (4) University of Graz

We have developed a two-dimensional model of the lunar exosphere using Monte Carlo integration techniques to incorporate a variety of physical source processes. In particular, the sputtering of the surface as a result of impinging energetic solar wind particles is modelled in detail using the TRIM (Transport of Ions in Matter) code. The resulting steady-state velocity distributions of sputtered species then define the vertical structure of the exosphere. Four different target compositions have been modelled, each reflecting a particular type of lunar soil: highland, high-titanium mare, low-titanium mare and KREEP soils were chosen as representative end-members.

We will present a comparison of our model results with experimental measurements of the lunar exosphere. Our aim is to validate our model so that future measurements of the exosphere around the planet Mercury can be used to constrain the hermean surface composition over a known spatial scale.