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Mercury's ionized exosphere: Global structure and ion dynamics

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The Mercury plasma environment is enriched in heavy ions from photo-ionization of the neutral exosphere. The time-of-flight spectrometer FIPS onboard the MESSENGER spacecraft has detected many planetary ion species, of which He^+, the Na^+-group (including Na^+, Mg^+ and Si^+) and the O^+-group (including O^+ and several water group ions) are the most abundant. Previous models of the planetary ion distribution inside Mercury's magnetosphere have concentrated on the abundant Na^+ and H^+ ion populations. Comparison with FIPS data has been limited to the first two MESSENGER flybys. We have developed a test-particle model which describes the full 3D distribution of several planetary ion species which are derived from the neutral exosphere. The global ion density and energy distribution of Na^+, O^+ and He^+ will be presented here. We will also describe the orbital evolution of the Na^+ ion density.

Field

Planetology (incuding small bodies and exoplanets)

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