



Scientific goals for the ion mass analyzer on-board the Chandrayaan-1 mission to the Moon

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The ion mass analyzer (SWIM - Solar Wind Monitor) on-board the Chandrayaan-1 spacecraft to the Moon, which is scheduled for launch in September 2007, will primarily function as a complement to the energetic neutrals analyzer (CENA - Chandrayaan-1 Energetic Neutrals Analyzer). By monitoring of the solar wind, SWIM will enrich the scientific outputs from the observations of the energetic neutral atoms sputtered from the Lunar surface. There are though several additional topics that SWIM would be able to make contributions to the lunar plasma science. The first topic is the physics of mini-magnetosphere systems. Measurements of the ions in the vicinity of the locally magnetized regions can give important information of the smallscale interaction between the magnetic anomalies and the solar wind. Because the lunar mini-magnetosphere systems are the smallest known magnetosphere, the information is quite valuable for comparable studies of planetary magnetospheres. The second topic is the investigation of ions of lunar origin. Lunar ions are generated by photoionization of exospheric atoms, photon- and electron-stimulated desorption, micro-meteorite vaporization, and the solar wind ion sputtering. Since these ions contain information of the surface materials, we would be able to make surface composition maps by tracing the trajectories of the lunar ions. The third topic is the study of the ion behaviour in the lunar wake. At the wake boundary, there exists a relatively large bipolar electric potential drop (~400 V), which is one order higher than the predicted values by the classical theory of the bipolar diffusion. By measuring solar wind disturbances by the potential drop, we could be able to derive the electric field on the night side. In this presentation, we will discuss the feasibilities of these possible scientific topics.