



The Mass Spectrum Analyzer onboard Bepi Colombo MMO: Scientific objectives and prototype results

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The Mercury Magnetospheric Orbiter (MMO) that is scheduled for launch in 2013 as part of the Bepi Colombo mission, will be dedicated to analysis of the magnetized environment of Mercury. A comprehensive set of sensors will be flown onboard this spacecraft, that will allow in-depth analysis of the charged particle dynamics at Mercury. Among these sensors, MSA (Mass Spectrum Analyzer) is the experiment dedicated to ion composition analysis. It consists of a top-hat for energy analysis followed by a Time of Flight (ToF) section to derive the ion mass. A notable feature of MSA is that the ToF section is polarized with a linear electric field that provides enhanced mass resolution, a capability that is of importance at Mercury since a variety of species originating from the tenuous atmosphere of the planet is expected. MSA exhibits two detection planes : (i) one with moderate mass resolution but a high count rate making MSA appropriate for plasma analysis, (ii) another with a mass resolution above 40 though with a low count rate making it appropriate for planetology science. Taking advantage of the spacecraft rotation, MSA will provide three-dimensional distribution functions of magnetospheric ions from energies characteristic of exospheric populations (a few eVs or a few tens of eVs) up the plasma sheet energy range (up to ~ 40 keV/q) in half a spin (2 seconds). We will discuss the scientific objectives of MSA together with results obtained from the prototype.