Geophysical Research Abstracts
Vol. 14, EGU2012-13702, 2012
EGU General Assembly 2012

BepiColombo Serena/ELENA instrument:development and testing

S. Orsini (1), E. De Angelis (1), S. Selci (2), A.M: Di Lellis (3), R. Leoni (4), R. Rispoli (1), L. Colasanti (1), N. Vertolli (1), J. Scheer (5), A. Mura (1), A. Milillo (1), P. Wurz (5), M. D'Alessandro (2), D. Maschietti (3), F. Mattioli (4), S. Cibella (4), D. Brienza (3), and Compagnia Generale per lo Spazio (6)

(1) IAPS-IFSI, Rome, Italy, (2) ISC-CNR, Rome, Italy, (3) AMDL src, (4) IFN-CNR, Rome, Italy, (5) Bern Physikalisches Institut, University of, Switzerland, (6) CGS

ELENA is a TOF sensor, based on a novel concept ultra-sonic oscillating shutter (Start section) which is operated at frequencies up to 50 kHz; a MCP detector is used as a Stop section. It is aimed to detect neutral atoms in the range 10 eV - 5 keV, within 70° FOV, perpendicular to the S/C orbital plane. ELENA will monitor the emission of neutral atoms from the whole surface of Mercury thanks to the spacecraft motion. The major scientific objectives are the interaction between the environment and the planet, the global particle loss-rate and the remote sensing of the surface properties. In particular, surface release processes are investigated by identifying particles release from the surface, via solar wind-induced ion sputtering (<1eV - >100 eV) as well as Hydrogen back-scattered at hundreds eV. In particular, the capability to detect non-thermal low energy neutral species is crucial for the sensor ELENA (Emitted Low-Energy Neutral Atoms), part of the package SERENA (Search for Exospheric Refilling and Emitted Natural Abundances) on board the BepiColombo mission to Mercury to be launched in 2014.
The instrument is now validated and tested to reach its performances: the up-graded shutter system (Start section) has been operated for the first time with neutral atom beam and tested at high frequency, the Stop section has been calibrated investigating the region of very low energy detection efficiency, the electronics boards and the entire acquisition chain has been appointed and tested with ion beam. The first results of all the ELENA capability will be presented.