Geophysical Research Abstracts
Vol. 14, EGU2012-8859, 2012
EGU General Assembly 2012

ELENA MCP detector: absolute efficiency measurement for low energy neutral atoms

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

(1) IAPS-INAF, Rome, Italy, (2) Physikalisches Institut, University of Bern, (3) ISC-CNR, Rome, Italy, (4) AMDL srl, Rome, Italy , (5) IFN-CNR, Rome, Italy

MicroChannel plates (MCP) detectors are frequently used in space instrumentation for detecting a wide range of radiation and particles. 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.
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 and >100 eV) as well as Hydrogen back-scattered at hundreds eV.
MCP absolute detection efficiency for very low energy neutral atoms (E< 30eV) is a crucial point not yet investigated. At the MEFISTO facility of the Physical Institute of University of Bern (CH), measurements on three different type of MCPs coating have been performed providing the behaviors of MCP detection efficiency in the range 10eV-1keV. Outcomes from such measurements are here discussed.