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ELENA and STROFIO: The BepiColombo/MPO/SERENA Neutral Particle Analysers

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Measurements of the exospheric composition, altitude profile and particle distributions (related to surface local structures and spatial anisotropies) will help to explain the cycling of volatile elements between Mercury's surface and exosphere. Moreover, such measurements may clarify the contribution of meteoritic material and solar wind plasma to Mercury's near-surface volatile budget. In particular, the study of the Mer-

cury's exosphere interaction with the solar wind and with the surface of the planet can provide important clues on planetary evolution. In fact, the Hermean exosphere is continuously eroded and refilled by these interactions, so that the surface, the exosphere and the magnetosphere are strongly linked to each other. A comprehensive suite for particle detection in the Mercury's environment, the SERENA instrument, is included in the MPO payload of the ESA cornerstone BepiColombo mission. The SERENA package consists of four units: STROFIO and ELENA (NPA) will identify the neutral particles and measure their energies in the range from fractions of eV to a few keVs, and MIPA and PICAM (IS) will measure and analyze ionized particles of planetary and solar wind origin from tens eV to tens of keV. The exospheric in-situ observations by the SERENA units will provide important information on the surface-exosphere-magnetosphere system. In this study the basic concept of the two neutral sensors of SERENA is described and the planetary environment, as seen by these two neutral sensors, is simulated. The main SERENA NPA scientific objectives are outlined.