

**THE MERCURY ATMOSPHERIC AND SURFACE COMPOSITION SPECTROMETER  
(MASCS) FOR THE MERCURY: SURFACE, SPACE ENVIRONMENT, GEOCHEMISTRY,  
RANGING (MESSENGER) MISSION.**

William E. McClintock  
Laboratory for Atmospheric and Space Physics  
1234 Innovation Dr.  
Boulder Co, 80303-7814  
william.mcclintock@colorado.edu

and

Gregory M. Holsclaw  
Laboratory for Atmospheric and Space Physics  
1234 Innovation Dr.  
Boulder Co, 80303-7814  
gregory.holsclaw@colorado.edu

MASCS is one of seven science instruments aboard the MESSENGER spacecraft, which will orbit Mercury beginning in 2009. It consists of a small Cassegrain telescope that simultaneously feeds a scanning grating UltraViolet-Visible Spectrometer (UVVS) and a fixed grating Visible-InfraRed Spectrograph (VIRS).

The UVVS will measure the composition and structure Mercury's exosphere, study its neutral and coronal gas, and search for and measure ionized atmospheric species. These measurements will contribute to our understanding of the processes that generate and maintain the atmosphere, the connection between surface and atmospheric composition, the transport of volatile materials on and near mercury, and the nature of the bright radar-reflective materials at its poles.

The VIRS will measure surface reflectance from 0.3 to 1.4 micrometers with a spatial resolution ~ 5 km. This wavelength range contains spectral signatures of Fe<sup>++</sup>, Ca Silicates, TiO<sub>2</sub> and FeO. These measurements will be combined with multispectral images obtained with the Mercury Dual Imaging System and elemental composition measurements from the MESSENGER Gamma Ray and X-Ray Spectrometers to determine composition and study the effects of space weathering on the surface.

In this presentation we describe the capabilities of the MASCS, its measurement and science objectives, and how those objectives help to answer the key science questions that define the MESSENGER Mission.