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Neutral Mass Spectrometer (NMS) for the Lunar Atmosphere and Dust Environment  
Explorer (LADEE) Mission

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The Lunar Atmosphere and Dust Environment Explorer (LADEE) mission currently scheduled for launch in early 2013 aboard a Minotaur V will orbit the moon at a nominal periselene of 50 km to characterize the lunar atmosphere and dust environment. The science instrument payload includes a neutral mass spectrometer as well as an ultraviolet spectrometer and a dust detector. Although to date only He, Ar-40, K, Na and Rn-222 have been firmly identified in the lunar exosphere and arise from the solar wind (He), the lunar regolith (K and Na) and the lunar interior (Ar-40, Rn-222), upper limits have been set for a large number of other species. LADEE Neutral Mass Spectrometer (NMS) observations will determine the abundance of several species and substantially lower the present upper limits for many others. Additionally, LADEE NMS will observe the spatial distribution and temporal variability of species which condense at nighttime and show peak concentrations at the dawn terminator (e.g. Ar-40), possible episodic release from the lunar interior, and the results of sputtering or desorption processes from the regolith. In this presentation, we describe the LADEE NMS hardware and the anticipated science results.