Near Infrared Spectrometry with SIR on SMART-1

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SIR is a compact low mass (2 kg) spectrometer designed to measure reflectance spectra of the lunar surface on the SMART-1 spacecraft. Its superior sensitivity in the wavelength range between 900 and 2400 nm offers the possibility to identify the mineralogical composition of the lunar surface to a new level of accuracy. Compared with the Clementine multi-color-data, SIR will measure complete spectra with much higher spectral resolution and therefore it will be possible to determine the positions of the mineral absorption bands more accurately. Moreover, SIR is not affected by the broad atmospheric water absorptions like ground-based observations and it achieves also a much higher spatial resolution.

This capability is of particular importance for the study of features like maria, craters, volcanos and fracture edges, which will give us insights into deeper crust- and mantel material which will provide further insight into the history of the Moon and the Earth-Moon system. The reflectance spectra obtained over a large range of viewing geometries will be useful to study the dependence of spectra from phase angle and Space Weathering Effects.