Measurements of the Radiation Environment in Low Lunar Orbit with LRO/CRaTER

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The CRaTER (Cosmic Ray Telescope for the Effects of Radiation) instrument is currently in operation in low, lunar orbit aboard the LRO (Lunar Reconnaissance Orbiter). CRaTER is designed to characterize the global lunar radiation environment and its biological impacts. The primary sources of radiation encountered in lunar orbit are galactic cosmic rays and solar energetic particles. Secondaries from the nearby lunar surface and from interactions of the primaries with the LRO spacecraft also contribute to the ambient radiation environment.

The primary CRaTER detection system is a stack of six silicon detectors in a telescopic arrangement that directly measures the incident LET (linear energy transfer) spectra for energies above a few tens of MeV and for ions species from hydrogen to iron-peak nuclei. In addition to this silicon telescope, the CRaTER investigation contains a prototype dosimeter that has just become commercially available. This small device has been designed for incorporation in all spacecraft, ideally not just one but a dosimeter in every radiation-sensitive box or area. Details of the dosimeter design and performance can be found at: http://www.teledynemicro.com/space/space_micro_dosimeter.asp
In this talk we compare and contrast the primary radiation measurements made with the CRaTER LET telescope with the measurements of the total radiation environment as measured by the dosimeter.