



Measuring Neutrons and Gamma Rays on Mars - The Mars Science Laboratory Radiation Assessment Detector MSL/RAD

Cesar Martin (1), Onno Kortmann (1), Eckart Boehm (1), Stephan Boettcher (1), Alexander Kharytonov (1), Bent Ehresmann (1), Robert F. Wimmer-Schweingruber (1), Donald M. Hassler (2), and Cary Zeitlin (2)

(1) Institut fuer Experimentelle und Angewandte Physik, Christian-Albrechts-Universitat zu Kiel, 24098 Kiel, Germany, (2) Southwest Research Institute, Boulder Colorado, USA

The Mars Science Laboratory (MSL) missions Radiation Assessment Detector (RAD) will measure the radiation environment on the Martian surface. One of the difficult measurements is that of the neutral radiation component consisting of neutrons and gamma rays. Different from Earth, this neutral component contributes substantially to the total dose on the planetary surface, principally because the Martian atmosphere is so thin.

We will present methods to invert neutral particle data acquired with MSL's RAD instrument and compare them with calibration data. While the agreement is good for neutrons from a calibration beam in a forward model, more work is required for omnidirectional neutrons with unknown spectral properties using other inversion techniques. We expect an asymmetry in fluxes from soil and sky for neutrons. Preliminary simulation results show a different behavior for gamma rays. Therefore, models of the IRF are likely to require additional inputs about the radiation environment.