AOGS 2006

Prediction of the Moon Radiation Environment During the Chandrayaan-1 Flight After 2007

GIOVANNI DE ANGELIS[1], TSVETAN P. DACHEV[2], FRANTISEK SPURNY[3], JEAN-FRANCOIS BOTTOLLIER-DEPOIS[4]

[1] *National Institute of Health - Italy*

[2] *STIL-BAS, Bulgarian Academy of Sciences, Sofia, BG-1113, Bulgaria*

[3] *Nuclear Physics Institute, Czech Academy of Sciences, Prague, CZ-18086, Czech Republic*

[4] *Institut de Radioprotection et de Surete Nucleare, Fontenay-aux-Roses, F-92255, France*

In view of manned missions targeted to the Moon, for which radiation exposure is one of the greatest challenges to be tackled, it is of fundamental importance the determination of the particle flux and spectra at any time and at any point of the lunar surface. Radiation-related investigations have been envisaged for most future Moon-targeted space missions. One of the future missions is the Indian lunar satellite CHANDRAYAAN-1. This lunar orbiter mission is described in its own website http://www. isro. org/chandrayaan-1/ as well as in the NASA space missions website http://nssdc. gsfc. nasa. gov/database/MasterCatalog?sc=CHANDRYN1. The RADOM experiment, selected for the payload of the Indian lunar satellite ChANDRAYAAN-1, consists in a small-size and low-power-consumption radiation spectrometer which characterizes the spectrum of the deposited energy in 256 channels within the 0.3 mm thickness of the silicon detector. The instrument will be built in the Solar-Terrestrial Influences Laboratory (STIL-BAS), Bulgarian Academy of Sciences, whereas the data analysis will be performed by the Italian National Institute of Health, in collaboration with Nuclear Physics Institute from the Czech Academy of Sciences, and with the 'Institut de Radioprotection et de Sûreté Nucléaire (IRSN)' ("Institute of Radioprotection and Nuclear Safety"), France. With the new model of the Moon's radiation environment due to Galactic Cosmic Rays (GCR) and Solar Particle Events (SPE) developed by Giovanni De Angelis, the expected particles fields to be observed by RADOM have been computed for the epoch in which the lunar orbital flight will take place. Results are shown in terms of fluxes, doses and LET, for most kinds of particles, namely protons, neutrons, alpha particles, heavy ions, electron, photons, pions and muons, for various soil and rock composition, and for the geometry of the RADOM detector.// Keywords: Radiation; Moon; surfaces; subsurface; modeling; doses; instrumentation.