

Keynote Address — Planetary Environments for Radiation Analysis

GIOVANNI DE ANGELIS

National Institute of Health - Italy

In this introductory talk the essence of environmental modeling is presented as suited for radiation analysis purposes. The variables of fundamental importance for radiation environmental assessment are discussed. The characterization is performed by dividing modeling into three areas, namely the interplanetary medium, the circumplanetary environment, and the planetary or satellite surface and subsurface. In the first area, the galactic cosmic rays (GCR) and their modulation by the heliospheric magnetic field as well as solar particle events (SPE) are considered, in the second area the magnetospheres are taken into account, and in the third area the effect of the planetary geophysical environment is also considered. Planetary surfaces and atmospheres are modeled based on results from the most recent targeted spacecraft. The results are coupled with suited visualization techniques and radiation transport models in support of trade studies of spacecraft and crew health risks for future exploration missions. The current state-of-the-art knowledge on the Moon and Mars radiation environments will be shown, along with the environmental description used in these models as boundary conditions. The effects on planetary science knowledge given by radiation data from spacecraft will be also pointed out.// Keywords: Radiation; planets; atmosphere; surfaces; subsurfaces; modeling; doses.