The PLANETOCOSMICS Geant4 application

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In order to assess the radiation risk for manned space missions, complex codes are needed to evaluate the radiation environment of a specific planet. PLANETOCOSMICS is a simulation framework based on Geant4 that allows to compute the interaction of cosmic rays ($<$1TeV) with the Earth, Mars and Mercury. For all these planets different models of atmosphere and magnetic field can be selected. A soil made of user defined superposed homogeneous layers can also be taken into account. The main applications of the code are: i) The computation of the propagation of charged particles in the planet magnetosphere; ii) the computation of the flux of particles resulting from the interaction of cosmic rays with the planet atmosphere and soil at user defined altitudes; iii) the computation of the energy deposited by cosmic ray showers in the planet's atmosphere; and iv) the visualisation of magnetic field lines, and trajectories of primary and secondary particles in the planetary environment. PLANETOCOSMICS has been developed such that the implementation of new atmospheric and magnetic field models as well as the extension to other planetary environments is rather simple. As a Geant4 application it offers a user friendly interface. The source and executable code can be downloaded from http://cosray.unibe.ch/~laurent/planetocosmics/. We will describe the capabilities of PLANETOCOSMICS and present various simulation results.