Paper ID: 14753
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23rd SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY (E5)
Human Habitation Beyond Low Earth Orbit (3)

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STRUCTURAL RADIATION PROTECTION OPTIMIZATION FOR SPACE HABITATS

Abstract

Presence of high energy radiations from various sources with a wide range of energy in interplanetary space and on planetary surfaces creates a very harsh environment for live beings. In absence of appropriate natural radiation protection shielding such as atmosphere and/or electromagnetic fields, artificial protection against these radiations is vital for any human space mission.

We study transportation of energetic particle and electromagnetic radiations through various structures of different geometries and made of different materials, using the GEANT4 toolkit. We attempt to find a set of mass efficient geometry-material combinations which have strongest protection for constructing habitats under different radiation energy levels. We attempt to provide a set of reference structures for space architects in order to facilitate extraterrestrial habitat design.