

Geant 4

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The Radiation Environment from Galactic Cosmic Rays in a Lunar Habitat

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We have calculated how the radiation environment in a habitat on the surface of the Moon depends on the thickness of a habitat in the 1977 galactic cosmic-ray environment. Geant4.9.1 was used, and a hemispherical dome made of lunar regolith was used to simulate the lunar habitat. We have investigated the effective dose from both primary and secondary particles. The total effective dose showed a strong decrease with the habitat thickness. However, the effective dose values from secondary neutrons, charged pions, photons, electrons and positrons all showed a strong increase followed by a gradual decrease with the habitat thickness. The fraction of the summed effective dose from these secondary particles in the total effective dose increased with the habitat thickness, from about 5% for the no-habitat case to about 47% for the habitat with a thickness of 100 g/cm². This work has been published as Radiat.

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