

A Study on the Shielding Ability of Current Aerospace Materials of a Detector against High Energy Cosmic Rays

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High energy cosmic rays are one of the biggest concerns for a detector used in space and manned spaceflight, along with the swift development of the high energy experiments in space and spaceflight enterprise, the research of shielding materials against high energy cosmic rays has become increasingly important. In this study, by using Monte Carlo method, firstly we defined a simple detector in the form of human body, and then we designed the geometry of shielding structures with various shielding materials. At last we comprehensively considered the radiation shielding properties of various materials together with the consideration of mass problems of shielding materials. The radiological protection capability of materials against certain higher energy cosmic ray was appraised from the perspectives of radiation dose. The results concluded that under the same level of mass of shielding materials, it is advantageous to employ the composites and non-metal materials as shielding materials than using metal or alloy. For practical application, the shielding structure is usually consisted with multi-layers. The calculation result shows that a multi-layers shielding structure that has low density layer-high density layer-low density layers structure has a more ideal shielding effect.

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