Space Radiation and the Challenges Towards Effective Shielding Solutions

The hazards of space radiation and their effective mitigation strategies continue to pose special science and technology challenges to NASA. It is widely accepted now that shielding space vehicles and structures will have to rely on new and innovative materials since aluminum, like all high Z materials, are poor shields against the particulate and highly ionizing nature of space radiation. Shielding solutions, motivated and constrained by power and mass limitations, couple this realization with "multi-functionality," both in design concept as well as in material function and composition. Materials endowed with effective shielding properties as well as with some degree of multi-functionality may be the kernel of the so-called "radiation-smart" structures and designs. This talk will present some of the challenges and potential mitigation ideas towards the realization of such structures and designs.