

Abstract Submitted
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Critical Need for Radiation Damage Tools for Space Missions

RAM TRIPATHI, JOHN WILSON, NASA Langley Research Center — NASA has a new vision for space exploration in the 21st Century encompassing a broad range of human and robotic missions including missions to Moon, Mars and beyond. As a result, there is a focus on long duration space missions. NASA, as much as ever, is committed to the safety of the missions and the crew. Exposure from the hazards of severe space radiation in deep space long duration missions is ‘the show stopper.’ Thus, protection from the hazards of severe space radiation is of paramount importance for the new vision. There is an overwhelming emphasis on the reliability issues for the mission and the habitat. Accurate risk assessments critically depend on the accuracy of the input information about the interaction of ions with materials, electronics and tissues. A huge amount of essential experimental information for all the ions in space, across the periodic table, for a wide range of energies of several (up to a Trillion) orders of magnitude are needed for the radiation protection engineering for space missions that is simply not available (due to the high costs) and probably never will be. Therefore, there is a compelling need to develop reliable accurate models of nuclear reactions and structures that form the basic input ingredients. State-of-the-art nuclear cross sections models have been developed at the NASA Langley Research Center, however a considerable number of tools need to be developed to alleviate the situation. The vital role and importance of nuclear physics for space missions will be discussed.

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