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Nuclear Interaction Cross Sections for NASA's New Vision RAM TRIPATHI, NASA Langley Research Center, J. W. WILSON, NASA Langley Research Center — NASA has a new vision for space exploration in the 21^{st} 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. Protection from the hazards of severe space radiation in deep space long duration is of paramount importance for the new vision. Accurate risk assessments critically depend on the accuracy of the input nuclear cross sections of 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 interaction methodologies need to be developed to alleviate the situation.

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