Radiation Shielding for Nuclear Thermal Propulsion

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Abstract. Design and analysis of radiation shielding for nuclear thermal propulsion has continued at Marshall Space Flight Center. A set of optimization tools are in development, and strategies for shielding optimization will be discussed. Considerations for the concurrent design of internal and external shielding are likely required for a mass optimal shield design. The task of reducing radiation dose to crew from a nuclear engine is considered to be less challenging than the task of thermal mitigation for cryogenic propellant, especially considering the likely implementation of additional crew shielding for protection from solar particles and cosmic rays. Further consideration is thus made for the thermal effects of radiation absorption in cryogenic propellant. Materials challenges and possible methods of manufacturing are also discussed.

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