Abstract Submitted
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Magneto-Ionization Spacecraft Shield for Interplanetary Travel: Computational TRACE JOHNSON, DAVID ATRI, JUSTIN BRUTGER, KEEGAN FINGER, LUKE HOFMANN, JULIE LAFRANZO, LORIEN MACENULTY, MOLLY MCCORD, GAVIN MENNING, ETHAN MORTON, NOAH PETERSON, ATHANASIOS PETRIDIS[1], AJAL RC, WILL THOMAS, DANIEL VISCARRA, Drake University, MISSFIT COLLABORATION — Manned interplanetary travel requires prolonged exposure to high intensity radiation. The purpose of this work is to determine a viable shielding solution using a combination of magnetic-fields, ionization chambers and passive absorbers by developing the computational methods required to properly simulate the propagation of high-energy particles through such systems. We develop a code to simulate a magnetic field around the proposed spacecraft employing the matrix relaxation method. We utilize the output from this code in a separate propagation code to calculate the trajectory of charged particles through various gaseous and solid media and the given magnetic field. We account for relativistic effects and utilize the popular SRIM code to calculate the energy loss of such particles as they travel through the shield. The aim of this work is to produce highly accurate results that illustrate the motion of charged particles around the proposed spacecraft. Initially a deterministic code is used but a Monte-Carlo method to compute averages and standard deviations for particle attenuation is also being developed.

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