Project SHIELD

Society for Space Project SHIELD Team

Abstract

The purpose of this project is to develop a system to protect astronauts on long-duration space missions from the harmful effects of ionizing radiation. The current design being considered is one that uses a combination of magnetic fields and passive shielding material to protect the crew capsule. A simulation has been developed in MATLAB to model the behavior of high-energy particles when exposed to the design's magnetic field. Additional programs have been written to determine the proper amount and material of passive shielding to absorb any particles that pass through the magnetic field. Currently, the project is gathering data on the percentage of particles deflected by the magnetic field. Once all data has been gathered, the minimum weight and cost of the proposed solution will be calculated

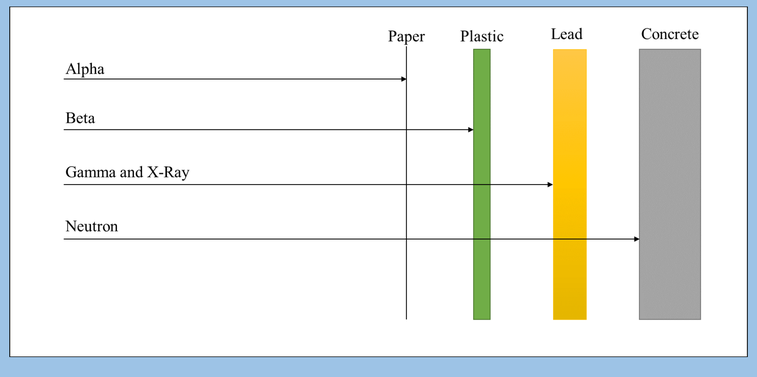

Figure 1: Radiation Shielding Effectivness

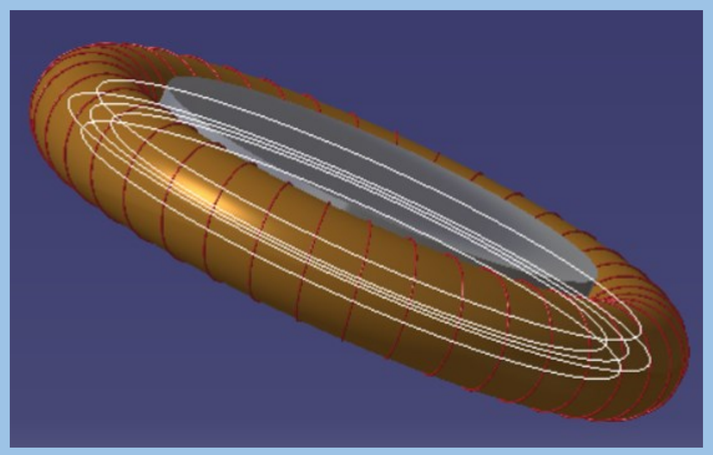

Figure 2: Rendering of concept

Methods

. Concept: Magnetic field around capsule; capsule material chosen to block excess radiation

. Created MATLAB programs to simulate behavior of systems

Preliminary Results

. 100% Success at 1 Amp

. Passive shielding layer likely a failsafe

. Current will be adjusted to minimize weight and cost

Future Direction

. Will test lower current values to minimize weight

. If results positive, empirical testing

. If not, partial solution may be viable

Acknowledgments

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. Brennan McCann

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. Society for Space

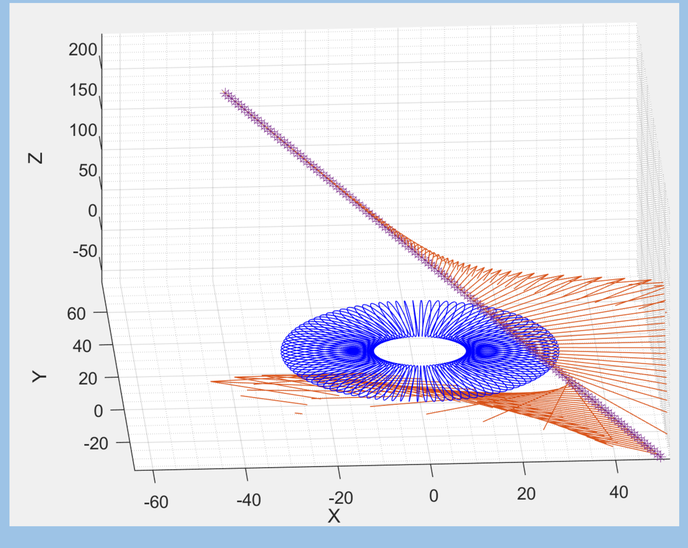

Figure 3: Particle track from EM simulations