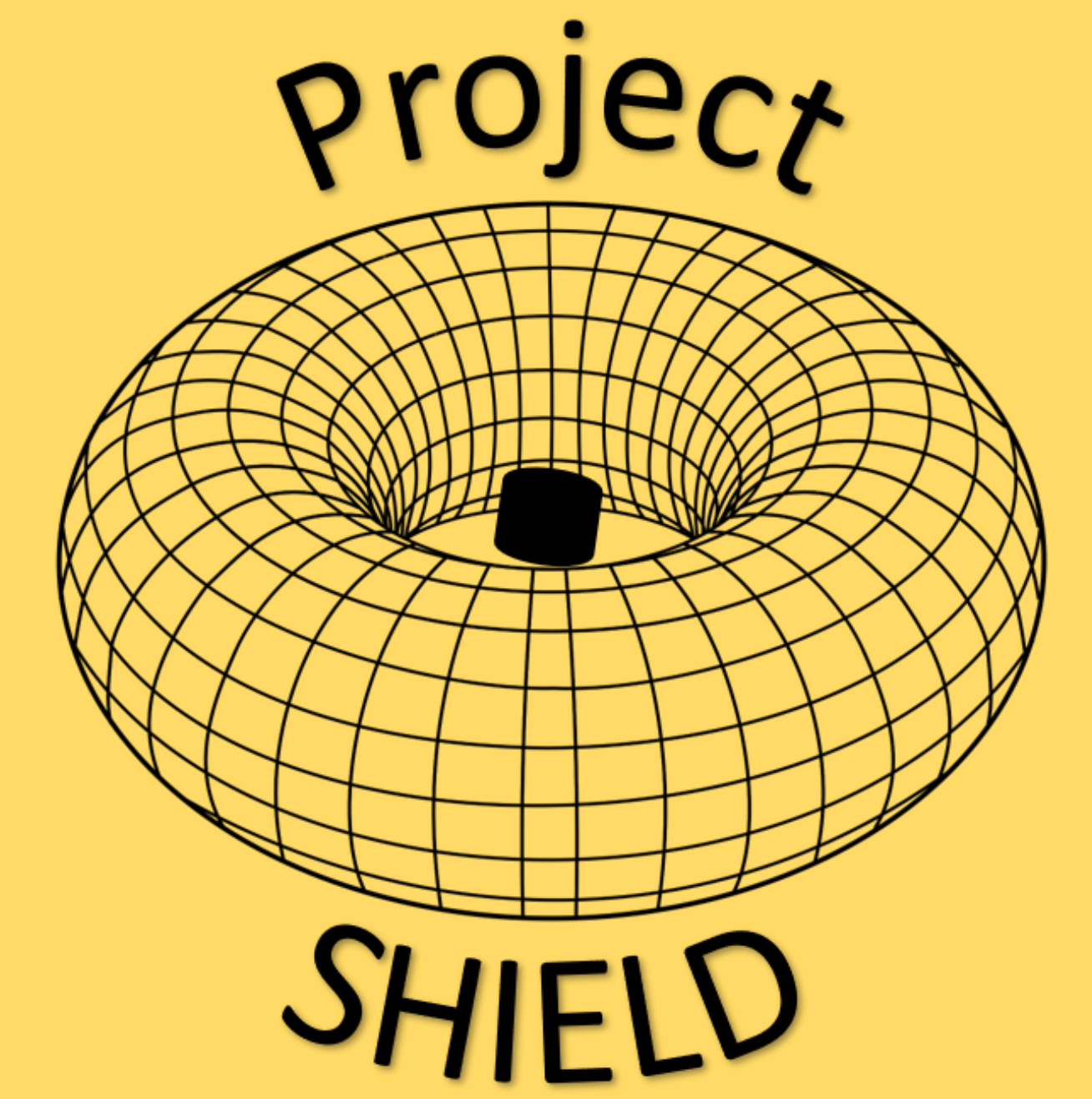




# Project SHIELD

## 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

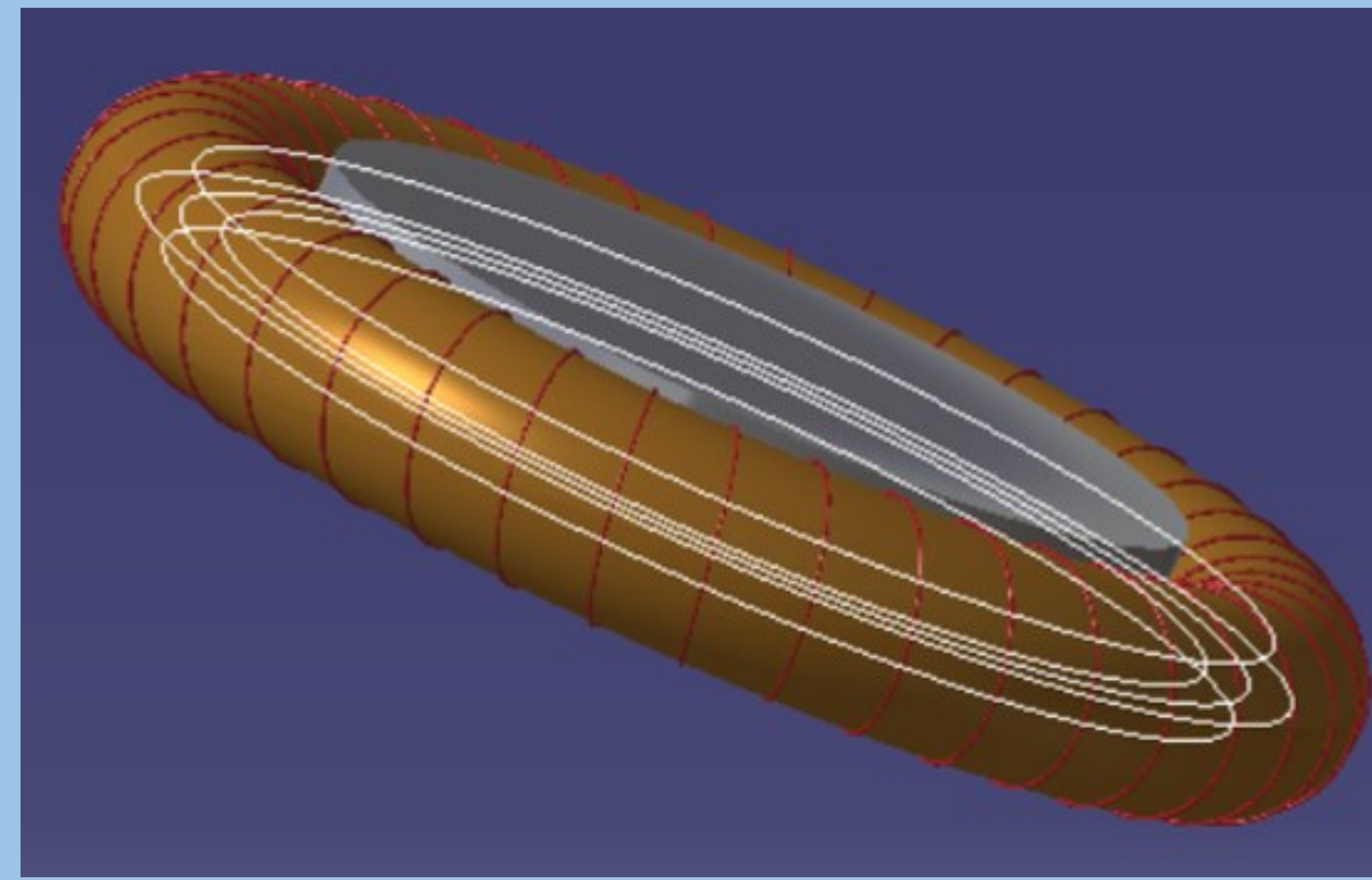


Figure 2: Rendering of concept

### 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

- . Dr. Matthew Zettergren
- . Brennan McCann
- . Embry-Riddle Aeronautical University
- . Society for Space

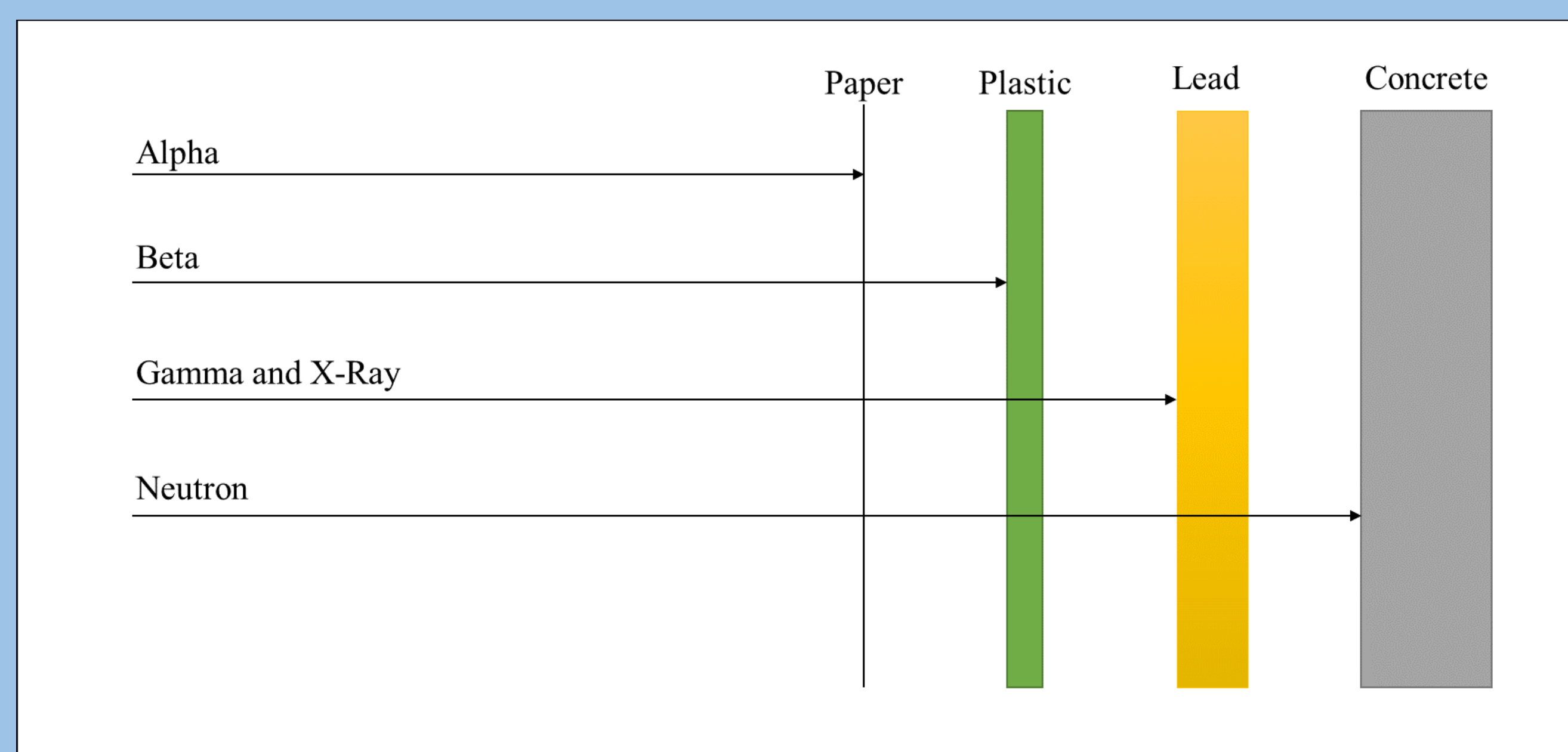


Figure 1: Radiation Shielding Effectiveness

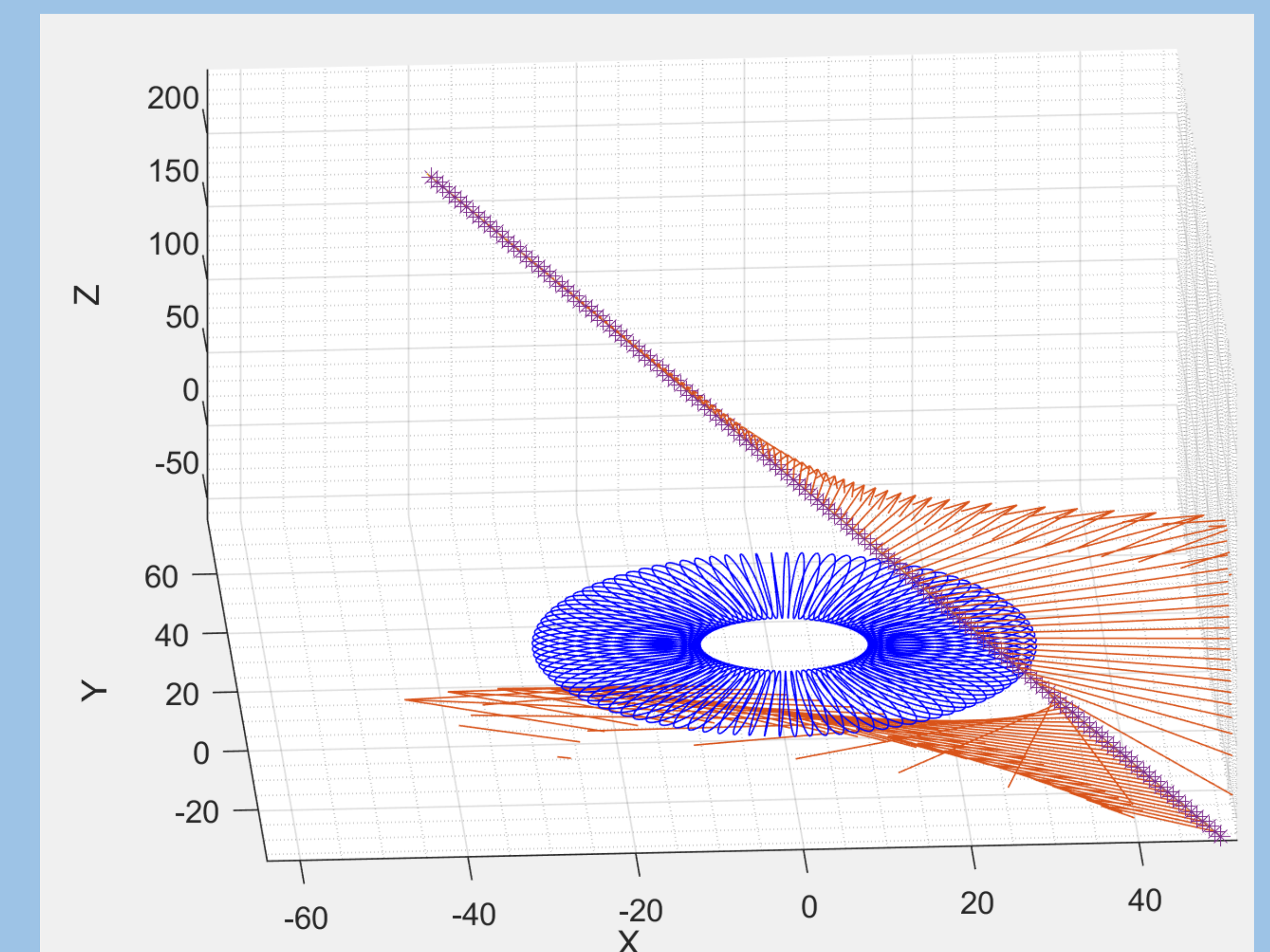


Figure 3: Particle track from EM simulations