UPC Workshop

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Problem

Problem A 2019

One of the challenges of sending humans to Mars is the significant **radiation** they would experience during the journey. Develop a plan for protecting humans in a spacecraft **traveling to Mars** from most radiation. To protect a habitable volume of **1,000 cubic meters**, how much **additional mass** would need to be brought on the journey? Provide a careful and thorough evaluation of your plan and its practicality.

Problem-Need-Solution

Need

- Radiation in solar system
- Minimize mass

- Radiation $\Rightarrow$ charged particles
- Minimize mass $\Rightarrow$ optimize shape

Good Assumptions

- Distribution of electric particles
- Rigid body
- Boundary effect
- ...

Selecting Physical Models (Toolbox)

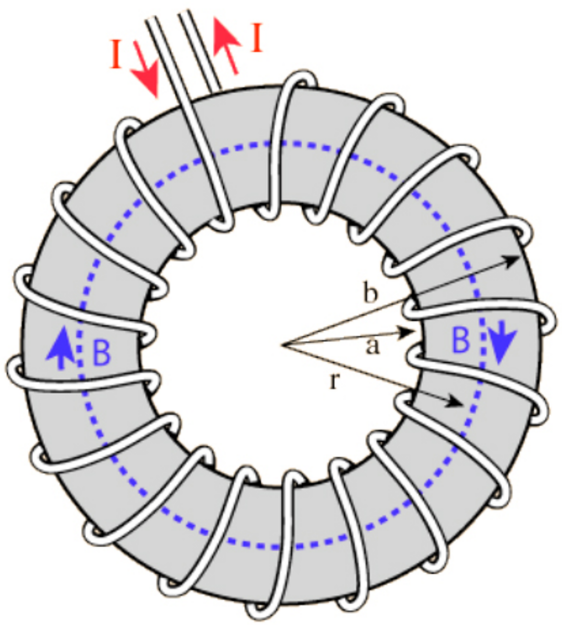

Figure: Toroid

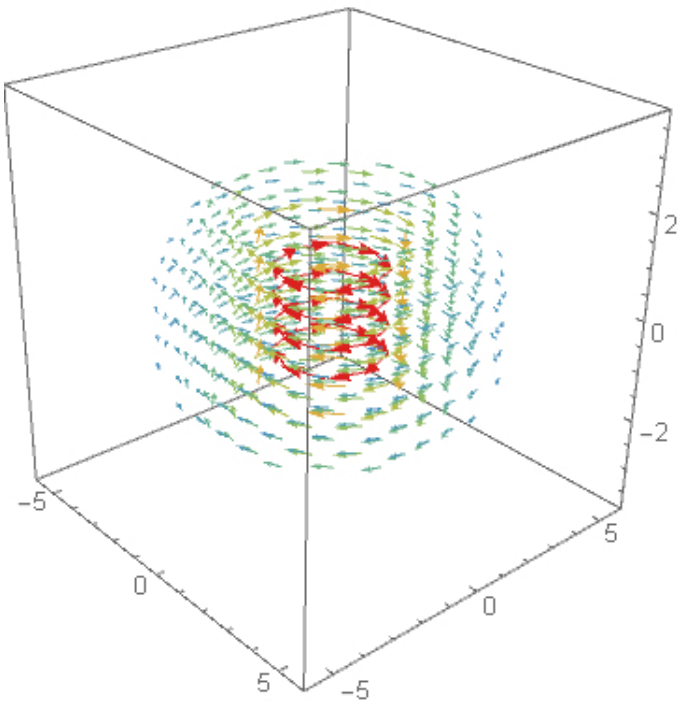

Figure: Magnetic field of toroid

Visualizing Results

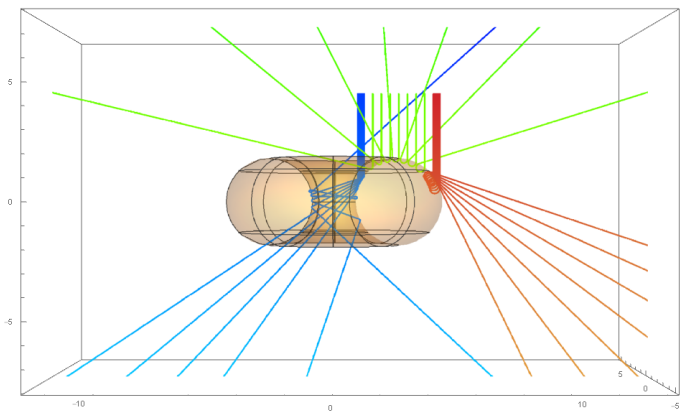

Figure: Simulation

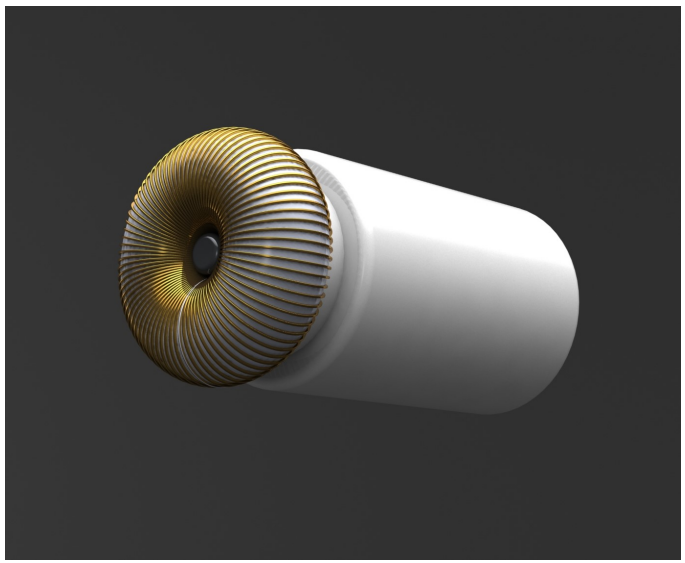

Figure: Spaceship

Have fun in UPC!