Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Magneto-Ionization Spacecraft Shield For Interplanetary Travel (MISSFIT): Biological & Mechanical Models*[1] KEEGAN FINGER, DAVID ATRI, JUSTIN BRUTGER, TREVIN DETWILER, GANNON HENRY, LUKE HOFMANN, TRACE JOHNSON, JULIE LAFRANZO, MEREDITH LUTTRELL[2], LORIEN MACENULTY, MOLLY MCCORD, GAVIN MENNING, ETHAN MORTON, NOAH PETERSON, ATHAN PETRIDIS[3], AJAL RC, HUNTER STOUT, WILL THOMAS, DANIEL VISCARRA, Drake University — When traveling through space more than just radiation damage to the body needs to be addressed, including the collisions of particles with the spacecraft; and the effects of microgravity and artificial gravity on the human body. The mechanical subgroup has developed an exploratory model for the two-dimensional impacts of spherical particles with a membrane to simulate the effects of debris collisions with a spacecraft in transit. Further, the mechanical subgroup is specifically exploring the usage of elastic and superelastic materials for large ionization-gas-containing chambers. The biological subgroup has developed a preliminary model for the one-dimensional flow of blood in the presence of an artificial gravity field that generates a Coriolis force within the vessel. This model is being used to investigate the effects of the Coriolis force on vascular transmural pressures and wall stress, both of which have been shown to result in thickening of the vessel walls and a decrease in inner radius.

[1]This project is supported by the Iowa Space Grant Consortium under NASA Award No. 80NSSC20M0107
[2]Advisor, Department of Biology
[3]Advisor, Department of Physics and Astronomy

Keegan Finger
Drake University

Date submitted: 19 Feb 2021 Electronic form version 1.4