

50th STUDENT CONFERENCE (E2)
Student Conference - Part 2 (2)

Author: Ms. Alexandra Martha Walser
Switzerland, ale.walser@outlook.com

RADIATION SHIELDING FOR INTERPLANETARY MISSIONS USING SUPERCONDUCTING
MAGNETS**Abstract**

The next logical steps in human space exploration are returning to the Moon, sending first crewed missions to Mars, and establishing self-sustaining human outposts on both celestial bodies. One of the major challenges is radiation shielding. It is very important for that shielding system to offer an effective protection to the crew members, while being lightweight, cost-effective, of low-complexity, and reusable. This paper suggests a design for an active shield using a superconducting magnet that surrounds the spacecraft. As the magnetic field is the strongest in the middle, a second, smaller coil is used to compensate it so that it is weaker inside of the spacecraft with the aim of not disturbing the crew's life, their mission experiments, and the instruments. As cooling is a challenge, the fuel tanks are arranged in such a way that the cryogenic fuel flows through the wires and acts as a coolant. As this design only works for charged particles, a passive shield is also needed.