**Development of 3D-printed Halbach Cylinder for Teaching and Research in Geomagnetism**

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***Abstract***

***Introduction***

Last sentence should be…”The goal of this study is to ….”

***Methods***

Each iteration of the ring’s design was created in *SOLIDWORKS 2019*. Cura was used for additional edits and for .gcode conversion.

The strength of the magnetic field produced in each orientation was measured with three probes, an axial hall probe, transverse hall probe, and lakeshore hall probe.

***Design***

The greatest time investment of this project was the design process of the cylinder. It took several iterations to determine the features necessary for the function of the ring.

The magnets chosen for this project are

It was decided that an initial assembly of 12 magnets would be effective. By the equations in (Raich and Blumer) a minimum inner diameter of 32.5mm was calculated, ensuring a close fit between magnets. A width of 17mm produced a ring that reasonably fit magnets in each orientation.

The final project resulted in a ring with recessed squares, 9.95 x 9.95 mm.

***Results***

***Discussion***

***Conclusions***

***Acknowledgements***

***References***

***Tables***

***Figures***