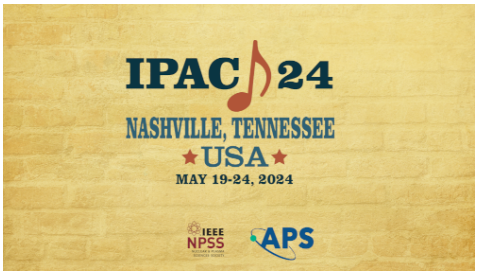

Contribution ID: **2205** Contribution code: **SUPG084** Type: **Poster Presentation**

Status of coil-dominated discrete-cosine-theta quadrupole prototype for high rigidity isotope beams

Sunday, 19 May 2024 16:00 (2 hours)

Iron-dominated superconducting magnets are one of the most popular and used design choices for superconducting magnetic quadrupoles for accelerator systems. While the iron yoke and pole tips are economic and effective in shaping the field, the large amount of iron also leads to certain drawbacks, namely, unwanted harmonics from the sextupole correctors nested inside of quadrupole iron pole tips. Additional problems include the nonlinear field profile present in the high-field regime caused by the presence of steel, the cryogenic design challenges of the iron yoke being part of the cold mass, and the mechanical challenges of mounting the sextupole and octupole, which will generate significant forces for apertures of the size being proposed. The Facility for Rare Isotope Beams is developing a coil dominated quadrupole as a future upgrade, and the presented work discusses the advantages of using an iron-free quadrupole, along with the methods and choices of the design and the current status of prototype fabrication. The methods and work presented will include the model results and the aspects of the model that have been verified up to the current status of prototype fabrication.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

North America

Primary author: GREENE, David (Facility for Rare Isotope Beams)

Co-authors: ZHANG, Danlu (Facility for Rare Isotope Beams, Michigan State University); WENSTROM, John (Michigan State University); OSTROUMOV, Peter (Facility for Rare Isotope Beams, Michigan State University); KOSCHAY, Ryan (Facility for Rare Isotope Beams, Michigan State University); XU, Ting (Facility for Rare Isotope Beams); DU, Xiaoji (Facility for Rare Isotope Beams, Michigan State University); AL-MAHMOUD, Yamen (Facility for Rare Isotope Beams, Michigan State University); CHOI, Yoonhyuck (Facility for Rare Isotope Beams)

Presenter: GREENE, David (Facility for Rare Isotope Beams)

Session Classification: Student Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T10 Superconducting Magnets