Contribution ID: **2388** Contribution code: **SUPS068** Type: **Student Poster Presentation**

RF design for a quadrupole resonator with a fundamental frequency of 325 MHz at IMP

Sunday 1 June 2025 14:00 (2 hours)

The Quadrupole Resonator (QPR), originally developed at CERN, is a dedicated radio-frequency characterization equipment for evaluating superconducting material. It employs the calorimetric compensation technique and has a surface resistance resolution of less than 1 nOhm, operaing over a wide range of parameters, such as tem-peratures, resonant frequencies and magnetic fields. As a part of R&D work of superconducting material for SRF application in particle accelerators. A QPR with operating frequency of 325 MHz has been developing at Institute of Modern Physics (IMP), CAS. In this paper, we present the detailed electromagnetic design of the QPR, the design focuses on reducing the risk of multipacting, field emis-sion (B_{pk}/E_{pk}) and mode overlapping (delta f = f_{QPR}-f_{dipole}), enhancing the attainable peak magnetic field (B_{sample}/B_{pk}). The electromagnetic simulation results indicate that the optimized structure has good electromagnetic performance. Additionally, the coupler design compatible with four QPR modes will be introduced. The cavity will be fabricated soon.

Footnotes

Paper preparation format

Word

Region represented

Asia

Funding Agency

Youth Innovation Promotion Association of Chinese Academy of Sciences (Grant No. 2022422).

Author: ZHAO, Yong (Institute of Modern Physics, Chinese Academy of Sciences)

Co-authors: HUANG, Shichun (Institute of Modern Physics, Chinese Academy of Sciences); YU, MIngming (Sichuan University); PENG, Long (Lanzhou University); HE, Yuan (Institute of Modern Physics, Chinese Academy of Sciences)

Presenter: ZHAO, Yong (Institute of Modern Physics, Chinese Academy of Sciences)

Session Classification: Student Poster

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T07 Superconducting RF