



Contribution ID: 502 Contribution code: WEPS52

Type: **Poster Presentation**

In situ plasma processing of superconducting cavities at JLab, 2024 update

Wednesday, 22 May 2024 16:00 (2 hours)

Jefferson Lab has an ongoing R&D program in plasma processing. The experimental program investigated processing using argon/oxygen and helium/oxygen gas mixtures. Plasma processing is a common technique where the free oxygen produced by the plasma breaks down and removes hydrocarbons from surfaces. This increases the work function and reduces the secondary emission coefficient. The initial focus of the effort was processing C100 cavities by injecting RF power into the HOM coupler ports. We also developed the methods for establishing a plasma in C75 cryomodules where the RF power is injected via the fundamental power-coupler. Four C100 cryomodules were in-situ processed in the CEBAF accelerator in May 2023 with the cryomodules returning to an operational status in Sept. 2023. The overall operational energy gain for the four cryomodules was 49 MeV. Methods, systems and results from processing cryomodules in the CEBAF accelerator and vertical test results will be presented. Current status and future plans will also be presented.

Footnotes

Funding Agency

Funding provided by SC Nuclear Physics Program through DOE SC Lab funding announcement DE-FOA-0002670

Paper preparation format

Region represented

North America

Primary author: POWERS, Tom (Thomas Jefferson National Accelerator Facility)

Co-authors: RAUT, Nabin (Thomas Jefferson National Accelerator Facility); GANEY, Tiffany (Thomas Jefferson National Accelerator Facility)

Presenter: SENEVIRATHNE, Iresha (Thomas Jefferson National Accelerator Facility)

Session Classification: Wednesday Poster Session

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

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