Contribution ID: **658** Contribution code: **TUPM065** Type: **Poster Presentation**

RF conditioning towards continuous wave of the RFQ of the linear IFMIF prototype accelerator

Tuesday, 9 May 2023 16:30 (2 hours)

The Linear IFMIF Prototype Accelerator (LIPAc) is designed to accelerate 125mA of deuteron beam to 9MeV in continuous wave (CW). The superconductive RF Linac has not yet been installed and the final accelerating stage now under commissioning is the RFQ. This system has been designed and developed by INFN (Italy) before installation in QST (Japan). The RFQ is the longest in the World with its 9.8m and requires RF power injection from 8 independent and synchronized coupler ports. LIPAc demonstrated the acceleration of 125mA deuteron beam at 5MeV for 1ms with a 1s repetition period in 2019. A fundamental milestone to extend beam operations to CW is the completion of the RFQ cavity RF conditioning up to CW. This work presents the strategy followed to successfully reach CW RF injection at 80% of the nominal 132kV vane voltage. The field distribution correction scheme (acting on cooling system at various power level) was successfully verified. We discuss as well the main challenges encountered on the way, which include updates of the RF system, failure of a circulator (by arcs) and the damages occurred on some of the RF couplers. Finally, the recent status and outlook will be provided.

Funding Agency

Footnotes

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Yes

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Session Classification: Tuesday Poster Session

Track Classification: MC4: Hadron Accelerators: MC4.A17: High Intensity Accelerators