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Molflow+ vacuum modeling of LIPAc Injector during operation campaign

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A Molfow+ vacuum study of the Injector of LIPAc*was done and its results compared with real operation campaign.*
LIPAc is a lineal accelerator located in the north of Japan whose purpose is to validate the engineering for the project IFMIF. During 2024 the commisioning phase B+ ended, which was the commissioning of LIPAc in its configuration without the SRF Linac*replaced by the MEBT* Extension Line (MEL). A maximum duty cycle of 8.75% with a pulse length of 3.5ms and a repetition period of 40ms at RFQ* cavity voltage of 132 kV and deuteron beam current of around 118 mA was achieved. Some trials were done at 10% duty cycle with 4ms pulse length and 40ms repetition period.
Experimental data from the operation campaign was used to make a comparison with a vacuum study achieved in Molflow+.In the injector there are two penning gauges and one residual gas analyzer located in the injector cavity. An updated 3D model of the cavity was made to get accurate results and boundary conditions replicating the campaign were set. Finally, results of the study show a good correlation of the Penning gauges measurements as they are inside the commom margin of error of this instrumentation.

Footnotes

*Linear IFMIF Prototype Accelerator*International Fusion Materials Irradiation Facility
*Superconducting Radiofrequency Linear Accelerator*Medium Energy Beam Transport
*Radiofrequency Quadrupoles

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