Contribution ID: **34** Type: **Contributed Oral**

CW operation of high-current deuteron injector for the Linear IFMIF Prototype Accelerator (LIPAc)

Monday, 8 September 2025 10:00 (20 minutes)

The Linear IFMIF (International Fusion Materials Irradiation Facility) Prototype Accelerator (LIPAc) aims at validating the design of the low energy section of the 40 MeV/125 mA IFMIF deuteron accelerator up to 9 MeV in continuous-wave (CW) operation. For such a high-power deuteron accelerator, the LIPAc injector is required to provide a stable deuteron beam of 100 keV, 140 mA with low emittance (≤0.25 π mm mrad). The injector is composed of an ECR ion source based on the CEA-Saclay SILHI source and a Low Energy Beam Transport (LEBT) line. In June 2024, the commissioning of the LIPAc accelerator was completed with the acceleration and transport of a 5 MeV deuteron beam at 9% duty cycle up to the beam dump, marking the completion of Phase B+. During this phase, the injector delivered a beam that met the LIPAc requirements and achieved the acceleration of a 120-mA deuteron beam (corresponding to an extracted current from the source of 160 mA) with a RFQ transmission exceeding 90%. Afterwards, in preparation for future phases, the LIPAc team proceeded with the CW beam commissioning of the injector in stand-alone operation, achieving a long run of 24 hours of CW operation with a total extracted beam current of 150 mA. This paper presents the results of the most recent CW injector campaign and provides an update on the ongoing assessment of the ion source's critical components and their expected lifetimes.

Primary author: AKAGI, Tomoya (QST)

Co-authors: BOLZON, Benoît (CEA); CISMONDI, Fabio (Fusion for Energy); DZITKO, Hervé (Fusion for Energy); MASUDA, Kai (QST); KONDO, Keitaro (QST); CHAUVIN, Nicolas (CEA); GONZÁLEZ CAMINAL, Pau (ATG Science & Engineering, S.L.); ITAGAKI, Tomonobu (QST); KITANO, Toshihiko (QST); CARIN, Yann (IFMIF/EVEDA Project Team)

Presenter: AKAGI, Tomoya (QST)

Session Classification: Oral Session

Track Classification: Production of high intensity ion beams