



Contribution ID: 945 Contribution code: MOPM076

Type: **Poster Presentation**

Transposition of the high-current beam transport strategy to new AIRIX functioning points obtained by increasing the diameter of the cathode

Monday 2 June 2025 16:00 (2 hours)

Experimental programs entrusted to the Franco-British EPURE facility require more and more flexibility with regard to the operation of different functioning points for our two Linear Induction Accelerators (LIA). In 2023, UPRX work (presented at IPAC'24) demonstrated our ability to control both reliability and repeatability of our first radiographic axis performances at high current (2.6 kA). To do this, a new strategy of electron beam transport based on the beam envelop constraint just downstream the injector module has been adopted, so as we managed to control BBU instabilities. In 2024, by increasing the diameter of the first radiographic axis cathode (from 63.5 to 70mm), we explored different “current/voltage” combinations and have demonstrated that the 2024 transport strategy could be transposed to the new generated beams at both 2.6 and 3kA (and a nominal 3.8 MeV energy at leaving from injector). We consequently proved our capacity to reach higher level of dose and a detailed analysis of the new beam initial conditions has highlighted the advantage of this new cathode, notably in view of optimizing the photonic focal spot size.

Footnotes

Paper preparation format

Word

Region represented

Europe

Funding Agency

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Session Classification: Monday Poster Session

Track Classification: MC1 :Colliders and Related Accelerators: MC1.A08 Linear Accelerators