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ELISA: a compact linear accelerator for societal applications

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ELISA (Experimental Linac for Surface Analysis) is a linear proton accelerator installed in the Science Gateway exhibition at CERN since October 2023. Its development is built upon the experience gained at CERN from the R&D for LINAC4, with an innovative design of the Radio Frequency Quadrupole (RFQ). With a footprint of only 2x1 square meters, ELISA has the potential of full portability and requires manufacturing capabilities already established in industries involved in medical and societal applications of accelerators. ELISA consists of an ion source, a one-meter-long RFQ working at 750 MHz and an analyzing line dedicated to Particle Induced X-ray Emission (PIXE). The system can accelerate a proton beam (extracted from the source at 20 keV) up to an energy of 2 MeV. In this paper we present the ELISA source commissioning and the optimization process that allowed to achieve the required brilliance. High energy beam commissioning will be also discussed, including beam current measurements at 2 MeV, investigation of the beam quality after acceleration and RFQ power scans to characterize the ELISA RFQ.

Footnotes

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Paper preparation format

LaTeX

Region represented

Europe

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