Contribution ID: **1483** Contribution code: **THPL042** Type: **Poster Presentation**

Design of a High-Power Linac for the industrial production of Isotopes

Thursday, 11 May 2023 16:30 (2 hours)

Medical isotopes are used for diagnostics and cure of tens of millions of patients worldwide every year. For the largest parts they are produced in fission reactors from enriched Uranium-235 leaving behind long-lived nuclear waste. Around the world organizations are therefore working to make medical isotope production more sustainable.
RI Research Instruments was commissioned by the Institute for Radioelements (IRE, Belgium) with the design of a superconducting electron linac (75MeV, 40mA, CW) for the industrial production of Mo-99.
The short development time and high requirements on availability (23h/d, ca. 360d/y) lead to the use of proven concepts from the Cornell CBETA accelerator and a redundant design with two DC photoguns able to produce the initial electron beam.
We report on the innovative aspects of this design. They include a merger feeding e-beam from either of the guns into the linac, a beam splitter dividing the beam 50/50 for illuminating the target from opposite sides, beam dynamics for low-loss beam transport, and a machine protection system able to switch the beam off in <1µs. For the region near the target, where high gamma and neutron doses occur, a radiation-hard design using pillow seals was developed.
For risk mitigation prototypes of the critical components were developed and are currently being tested. This involves especially the DC-photogun, which is described elsewhere.Test of a DC-photogun Injector for the Lighthouse facility, IPAC 2023.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary authors: KEUNE, Björn (RI Research Instruments GmbH); PIEL, Christian (RI Research Instruments GmbH); QUITMANN, Christoph (RI Research Instruments GmbH); TROMPETTER, Daniel (RI Research Instruments GmbH); BLOKESCH, Guido (RI Research Instruments GmbH); KRAEMER, Jakob (RI Research Instruments GmbH); HOTTENBACHER, Johannes (RI Research Instruments GmbH); GREWE, Marc (RI Research Instruments GmbH); PEKELER, Michael (RI Research Instruments GmbH); VOM STEIN, Peter (RI Research Instruments GmbH); TRINH, Trang (RI Research Instruments GmbH); KÜMPER, Verena (RI Research Instruments GmbH)

Co-authors: BLEEKER, Arno (ASML Netherlands B.V.); HOFFSTAETTER, Georg (Cornell University (CLASSE)); PLUG, Reinder (ASML)

Presenter: QUITMANN, Christoph (RI Research Instruments GmbH)

Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects: MC6.A28: Medical Applications