Contribution ID: **62** Type: **Poster**

H- Beam formation simulation in negative ion source for CERN's Linac4 accelerator

Thursday 6 October 2022 09:33 (5 minutes)

The caesiated surface negative ion (H⊠) source is the first element of CERN's LINAC4 a linear injector designed to accelerate negative hydrogen ions to 160MeV. The IS03 ion source, used during Run 3, is operated at 35 mA beam intensity, H^- ions are generated via plasma volume and caesiated molybdenum (Cs-Mo) plasma electrode surface mechanisms. The 3D PIC-Monte Carlo ONIX (Orsay Negative Ion eXtraction [1]) code has been written to study H⊠ beam formation processes in neutral injectors for fusion and adapted to single aperture accelerator H^- sources. The code was modified to match the conditions of the beam formation and extraction regions of the Linac4 H⊠ source [2]. A set of plasma parameters was chosen to characterize the plasma and to match the specific volume and surface production modes. New type of boundary conditions corresponding to single aperture sources are described in this contribution. Simulated results of the extraction regions are presented and benchmarked with experimental results obtained at the Linac4 test stand [3].

[1] A. Revel, S. Mochalskyy, I. M. Montellano, D. Wünderlich, U. Fantz and T. Minea, Journal of Applied Physics, vol. 122, no. 10, p. 103302, 2017.
[2] J. Lettry, D. Aguglia, S. Bertolo, S. Briefi, A. Butterworth, et. al. "CERN's Linac4 cesiated surface H– source" . AIP Conference Proceedings, vol. 1869, p. 030002, 2017. doi: 10.1063/1.4995722.
[3] J. Lettry et.al. "Beam Formation Studies on the CERN IS03b H Source", Journal of Physics: Conference Series, Volume 2244, 012036, 2022.

Author: VNUCHENKO, Anna (CERN)

Co-authors: REVEL, Adrien (LPGP); WÜNDERLICH , Dirk; LETTRY, Jacques (CERN); LINDQVIST, Max (Keio University (JP)); TIBERIU, Minea; Dr MOCHALSKYY, Serhiy (Max Planck Institute for Plasma Physics (IPP)); FANTZ, Ursel

Presenter: VNUCHENKO, Anna (CERN)

Session Classification: Poster Session 2

Track Classification: 12. Numerical simulations of sources or beams