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A comparison of DTL structures for a Proton Linac for a Compact Accelerator Based Neutron Source

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New neutron sources are needed both for Canada and internationally as access to reactor based neutrons shrinks. Compact Accelerator-based Neutron Sources (CANS) offer the possibility of an intense source of pulsed neutrons with a capital cost significantly lower than spallation sources. In an effort to close the neutron gap in Canada a prototype, Canadian compact accelerator-based neutron source (PC-CANS) is proposed for installation at the University of Windsor. The PC-CANS is envisaged to serve two neutron science instruments, a boron neutron capture therapy (BNCT) station and a beamline for fluorine-18 radioisotope production for positron emission tomography (PET). To serve these diverse applications of neutron beams, a linear accelerator solution is selected, that will provide 10 MeV protons with a peak current of 20 mA within a 5% duty cycle. The accelerator is based on an RFQ and DTL with a post-DTL pulsed kicker system to simultaneously deliver macro-pulses to each end-station. This study compares the performance of various DTL solutions including Alvarez, CH, and APF structures.

Keyword-1

Proton Linac

Keyword-2

PC-CANS

Keyword-3

DTL

Author: Ms ABBASLOU, Mina (UVic and TRIUMF)

Co-authors: Prof. GOTTBURG, Alexander (UVic and TRIUMF); Dr MAHARAJ, Dalini Deepa (TRIUMF); Prof. MARQUARDT, Drew (University of Windsor, Windsor, Ontario); Dr MARCHETTO, Marco (TRIUMF); Prof. KESTER, Oliver Karl (UVic and TRIUMF); Prof. LAXDAL, Robert Edward (TRIUMF); Dr TABBASSUM, Sana (Purdue University, West Lafayette, Indiana); Ms ABBASLOU, Mina

Presenter: Ms ABBASLOU, Mina (UVic and TRIUMF)

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