

Canadian Association of Physicists

Association canadienne des physiciens et physiciens

Contribution ID: **3860** Type: **Oral not-in-competition (Graduate Student)** / **Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

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

Monday 19 June 2023 17:00 (15 minutes)

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

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Session Classification: (DAPI) M3-6 Accelerator Physics and Instrumentation | Physique des accélérateurs et instrumentation (DPAI)

Track Classification: Technical Sessions / Sessions techniques: Applied Physics and Instrumentation / Physique appliquée et de l'instrumentation (DAPI / DPAI)