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## **Beam dynamics comparison of different structures towards a Compact Accelerator Based Neutron Source**

*Tuesday, October 21, 2025 9:00 AM (30 minutes)*

A prototype Canadian compact accelerator-driven neutron source (PC-CANS) is proposed. The source will utilize a high-intensity compact proton RF linear accelerator, delivering a peak current of 20 mA with a 5% duty factor of protons at 10 MeV to the target. The accelerator comprises a short radio-frequency quadrupole (RFQ) to 3 MeV, followed by a drift tube Linac (DTL) structure accelerating to 10 MeV. Various room temperature DTL variants, including Alvarez, and H-mode variants using APF, KONUS, and NPS (negative synchronous phase) beam dynamics are considered at a frequency of 352.2MHz. This paper compares the beam dynamics of the various structures. Comparisons include beam transmission, longitudinal and transverse emittance growth, Linac length, RF power and longitudinal and transverse phase acceptance. Beam dynamics simulations were conducted using the PARMTEQ, LANA, PARMILA, and Trace-3D codes. This work contributes to the development of high power proton linacs by providing a comparison in performance over several Linac structures.

### **Footnotes**

### **Funding Agency**

### **I have read and accept the Privacy Policy Statement**

Yes

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