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A Next Generation RF LINAC as Proton Driver For CANS

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The use of neutrons is established since decades and essential for industry, medicine, life sciences and research. Classical neutron sources are mainly neutron generators, with low neutron flux, or research reactors and spallation sources, which are large and cost intensive installations. A cost efficient, effective and compact neutron source could bridge the gap existing and offer potential users either a dedicated standalone version for high demands of a single application or a full variable user facility. Such a compact accelerator driven neutron source based on a radio frequency linear accelerator (linac) accelerating 10 - 20 mA of proton current to energies between 8 to 10 MeV can deliver neutron fluxes between 10^9 –10^{13} n/cm^2/s.
A concept for a reliable proton linear accelerator using a combination of high duty cycle H-mode cavities that can be cooled well and 4-rod RFQs suitable for cw operation presents a cost efficient, reliable and well proven linac design for such applications. The neutron target is based on diffusion bonded beryllium as the most suitable choice to be operated for such a neutron source. The linac will have about 15 m in total length including the target station and can be installed and operated for reasonable costs. We will present the current status of such an accelerator-based neutron source and potential perspectives.

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