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Preliminary Design of a Compact High-Flux Neutron Source Based on a Proton Linac

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Abstract

With the advancement of high-intensity proton linacs, compact neutron sources with a limited footprint have become feasible. Such a neutron source, consisting of a radio frequency (RF) ion source, a radio frequency quadrupole (RFQ), and a rotating Li target, operating in continuous wave (CW) mode, has been proposed. In this paper, we present the overall system design and considerations for beam dynamics. New techniques such as space charge compensation are employed to address the space charge effect. A preliminary beam dynamics design is described, featuring ultra-low beam loss, which is critical for such a system. The potential applications and key advantages of this compact high-flux neutron source are also briefly discussed.

Footnotes

Funding Agency

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Yes

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