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Present Status on Li-beam driving neutron generator R&Ds at BNL

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A compact accelerator-driven neutron generator with a lithium beam driver can generate neutrons in a forward direction, even using incident beam energy at a near-threshold energy. Especially for BNCT applications, the ability to suppress unwanted radiation to patients is a major advantage. However, it is difficult to supply a high-intensity lithium-ion beam, and its practical application has been considered impossible. Therefore, to solve the most important issue, the lack of ion flux, a direct plasma injection method was adopted. In this method, pulsed high-density plasma from a metallic lithium foil generated by laser ablation is efficiently injected and accelerated by a radio-frequency quadrupole linear accelerator (RFQ linac). As a result, a peak beam current of 35 mA, accelerated to 1.43 MeV, which is two orders of magnitude higher than the conventional injection/accelerator system, can be obtained.

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