

High Flux Neutron Generators for Critical Civil and Defense Applications (SHINE Technologies)

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SHINE Technologies, LLC and its sister company, Phoenix, LLC, have developed and matured through production readiness a suite of high flux, accelerator-based neutron generators to effectively address challenging use cases historically left to nuclear reactors which are less accessible and available. SHINE's deuterium-tritium (DT) system is the world's highest yield accelerator-based system producing predominantly fusion neutrons. SHINE's DT system was originally designed and developed as the driver of the manufacturing process of Molybdenum-99 (Mo-99), a medical radioisotope used worldwide for medical imaging that has traditionally been reliant on nuclear reactors. In 2023, SHINE launched a radiation effect testing service, dubbed FLARE (Fusion Linear Accelerator for Radiation Effects) in Janesville, WI, which employs the same DT gas target neutron source to deliver the highest flux steady-state 14 MeV neutron source for the survivability testing industry of defense and commercial electronics in space and of related diagnostics systems in emerging fusion power pilot plants. In 2020, Phoenix stood up its neutron imaging center in Fitchburg, Wisconsin, after years of design and development of a cyclotron-based Be (p,n) thermal and fast neutron source to address shortfalls in the accessibility of neutron radiography for non-destructive testing of critical aerospace and defense parts for potential manufacturing defects. The development of this inherently scalable approach to neutron generation has demonstrated that privately funded neutron sources are commercially viable, and that we can democratize access to neutrons and potentially significantly increase the user base by bringing neutron production to the open market.

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