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## Recent Work

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Compact Neutron and Gamma Sources

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Compact Neutron and Gamma Sources\*

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Abstract

Neutron or gamma sources are needed in most interrogation systems. The Plasma and Ion Source Technology Group at the Lawrence Berkeley National Laboratory has been developing compact neutron generators for over ten years. The neutrons in these generators are produced by either the D-D, D-T or the T-T fusion reaction. All these neutron generators consist of three major components; an ion source, an electrostatic accelerator and a Ti target. By using 13.5 MHz RF induction discharge, the ion source is capable of producing high current density with atomic deuterium (or tritium) ion percentage greater than 90%. Depending on the application, the Berkeley Group has developed various types of compact neutron source. Axial type D-D neutron generators have replaced radioactive sources for PGAA and NAA and educational training. Coaxial type high flux D-D neutron sources have been built for boron neutron capture therapy in cancer treatment. A short-pulse small point T-T neutron source is now being developed for explosive detection. In collaboration with Sandia National Laboratory, we are now investigating the use of similar source configurations to produce high energy gamma rays via nuclear reactions. The status of these neutron and gamma source development will be presented.

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