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Radiography with Fast DD and DT Neutron Generator, Associated Particle Imaging with DT Neutron Generator, and Grating Optics Applied to Fast Neutron Radiography

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Presented are fast neutron radiography, based on fast (2.5 MeV DD and 14 MeV DT) fusion-based, Adelphi neutron generators. Radiography experiments at LLNL with Adelphi 14 MeV source under a DARPA program are presented. Also reported are experiments Associated Particle Imaging (API) using a 14 MeV DT neutron generator, which provide a spatial map of the isotope composition of the fast neutron interrogated sample. Example of API presented is mapping carbon content within top 30 cm of soil. Also discussed is the prompt gamma neutron activation analysis, which can be applied to 14 MeV neutron interrogation of samples. Finally presented, is the potential use of grating optics developed by Refined Imaging for fast neutron radiography to improve resolution and contrast.

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