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Title:	Neutron Radiography at LANSCE: Interrogation and Characterization of Materials for Next Generation Nuclear Reactor Designs
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NEUTRON RADIOGRAPHY AT LANSCE: INTERROGATION AND CHARACTERIZATION OF MATERIALS FOR NEXT GENERATION NUCLEAR REACTOR DEGSINGS

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Neutron radiography is an ideal probe for integrating and characterizing potential nuclear fuel and moderator materials in next generation nuclear reactor designs. Due to the nature of interaction with the nucleus, neutrons have complex attenuation functions that result in contrast mechanisms and material penetrabilities that are not only well-suited investigating materials that contain high-Z isotopes (such as actinides in nuclear fuels), but also characterizing hydrogen distributions in various hydride materials considered in future moderator designs. Additionally, with a high intensity short-pulsed neutron source, Energy-Resolved Neutron Imaging can be utilized to map out specific isotopes based on neutron resonance absorptions with in a given material. Presented will be efforts in developing these capabilities on FP5, along with initial results from notable measurements ranging from thermophysical property characterization of uranium based molten salts, to H-concentration mapping in hydrides, to isotope mapping in fresh and irradiated fuel samples for post-irradiation examination (PIE).