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Neutron Imaging Developments at LANSCE[1] RON NELSON, JAMES HUNTER, RICHARD SCHIRATO, SVEN VOGEL, ALICIA SWIFT, TIM ICKES, BILL WARD, ADRIAN LOSKO, Los Alamos National Laboratory, ANTON TREMSIN, Lawrence Berkeley National Laboratory — Neutron imaging is complementary to x-ray imaging because of its sensitivity to light elements and greater penetration of high-Z materials. Energy-resolved neutron imaging can provide contrast enhancements for elements and isotopes due to the variations with energy in scattering cross sections due to nuclear resonances. These cross section differences exist due to compound nuclear resonances that are characteristic of each element and isotope, as well as broader resonances at higher energies. In addition, multi-probe imaging, such as combined photon and neutron imaging, is a powerful tool for discerning properties and features in materials that cannot be observed with a single probe. Recently, we have demonstrated neutron imaging, both radiography and computed tomography, using the moderated (Lujan Center) and high-energy (WNR facility) neutron sources at LANSCE. Flat panel x-ray detectors with suitable scintillator-converter screens provide good sensitivity for both low and high neutron energies. Micro-Channel-Plate detectors and iCCD scintillator camera systems that provide the fast time gating needed for energy-resolved imaging have been demonstrated as well. Examples of recent work will be shown including fluid flow in plants and imaging through dense thick objects.

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