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Multimodal Imaging from meV to MeV Neutrons combined with Gamma Imaging at the NECTAR Instrument

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Located at the SR10 at the FRM II, NECTAR is a versatile instrument and designed for the non-destructive inspection of various objects by means of fission neutron radiography and tomography. Compared to the Z-dependency of X-ray and gamma imaging, fission neutrons have the strong advantage of often providing similar contrast for heavy and light materials. Only few facilities around the world provide access to well collimated fast neutrons, with NECTAR at the FRM II being the only instrument that has a dedicated user program for fast neutron imaging. Aside from fast neutrons, thermal neutron as well as gamma imaging is possible by using different scintillator materials with the same detector system, extending NECTAR's imaging capabilities to different modalities.
Here we present the advantages of combining the information gained from neutron imaging in conjunction with gamma imaging at the NECTAR beam-line, providing a unique probe with unparalleled isotope identification capabilities with examples provided for archaeology, batteries, industry components and scintillator materials. Furthermore, we provide an update on the recent progress at NECTAR, with upgraded capabilities, such as the addition of gamma and single event-mode imaging.

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