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Combined Neutron and Gamma Tomography at the NECTAR instrument

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NECTAR is a superior beam-line with access to fission neutrons for non-destructive inspection of large and dense objects, where thermal neutrons or X-rays face limitations due to their comparatively low penetration. With the production of fission neutrons at the instrument, gamma rays are produced in the same process. The production of these gamma rays is inevitable as they are inherent with the production of fission neutrons and the principles of collimating or stopping them. Furthermore, these gamma rays are highly directional due to their constraint to the same beam-line geometry and come with similar divergence as the neutrons. While difficult to shield, it is possible to utilize them by using gamma sensitive scintillator screens in place of the neutron scintillators, viewed by the same camera. Here we present the advantages of combining the information gained from neutron imaging in conjunction with gamma imaging at the NECTAR beam-line, providing novel characterization capabilities.

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