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Double-Scatter Fast-Neutron Imaging for National Security Applications JOHN POLACK[1], Sandia National Laboratories — Fast neutron imaging based on two (or more) elastic scatters provides more event-by-event information on incident neutron energy and direction than imaging based on single-scatter events. However, the requirement of two scatters in different detectors means that this information comes at the cost of lower intrinsic efficiency. Sandia National Laboratories has been involved in the development of several double-scatter neutron imagers over the past decade, including the Neutron Scatter Camera and MINER (Mobile Imager of Neutrons for Emergency Responders). Recent work has been focused on developing uncertainty quantification techniques to help leverage the rich information carried by double-scatter events and provide quantitative decision metrics for detection and diagnostic applications. Work is also underway to develop a single-volume scatter camera, based on utilizing multiple neutron scatters in a single scintillator volume, which will mitigate the typical loss in efficiency suffered by double-scatter imagers. This talk will present a brief overview of this ongoing work, with a focus on simulated response characterization of both traditional double-scatter imagers and the single-volume scatter camera.

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