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**Laser plasma generated electron beams for high resolution long range radiography** VIDYA RAMANATHAN, SUDEEP BANERJEE, NATHAN POWERS, KUN ZHAO, NATE CHANDLER-SMITH, NATHANIEL CUNNINGHAM, DONALD UMSTADTER, University of Nebraska, SHAUN CLARKE, SARA POZZI, University of Michigan — Applications of tunable, collimated, high energy, monochromatic electron beams generated from a laser-plasma based accelerator are explored as active interrogation probes for long stand-off electron beam radiography. Besides being highly penetrating in nature the low-divergence of these electron beams, provides for an efficient delivery of the beam energy to a distant target. Laser wakefield accelerators are advantageous in that, they give rise to electron beams with micron-scale source size (comparable to the waist of the laser beam), which can provide superior image resolution. For the first time, electron beams are shown to resolve sub-millimeter ( $250\ \mu\text{m}$ ) structures that are embedded in thick and dense materials placed at a long standoff distance ( $\sim 2\text{m}$ ) from the source. Monte-Carlo simulations of the experimental results are also presented.

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