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Plasmonic Enhancement of Direct Optical Initiation DAVID MOORE, STEVEN CLARKE, ANNA GIAMBRA, Los Alamos National Laboratory, ADRIAN A. AKINCI, Los Alamos National Laboratory — Current Direct Optical Initiation (DOI) detonators use a laser focused onto a thin metal layer to drive a hot plasma and/or fragments into PETN powder. Previous studies showed a dramatic decrease in laser energies required to initiate the detonation using this approach over direct laser illumination of the PETN powder. Plasmonic metal nanostructures have been shown capable of strongly coupling laser energy into adjacent materials. We have incorporated gold nanospheres into PETN powder and are investigating their plasmonic enhancement of direct optical initiation via measurements of threshold laser energies and streak camera measurements for calculation of run to detonation distances compared to other DOI schemes.

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