

Abstract Submitted
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MaRIE: Matter-Radiation Interactions in Extremes, a Signature Facility Providing Experimental Resources for Transformational Materials Discovery CRIS W. BARNES, R.D. FULTON, DAVID J. FUNK, CARTER P. MUNSON, JOHN L. SARRAO, KURT F. SCHOENBERG, Los Alamos National Laboratory — Materials-centric national security science is vital for addressing 21st Century missions of energy security, stockpile stewardship, homeland security, and providing discovery science. Relevant grand challenges of the next two decades include: closing the 10 TW gap between the energy we have and the energy we need; transforming the enterprise of the nuclear weapons complex; and detecting threats with unprecedented sensitivity and efficiency. MaRIE is a proposed signature facility for Los Alamos National Laboratory that is centered on creating and exploiting radiation-matter interactions and providing transformational materials performance through validated predictive multi-scale understanding. Building on the capabilities of the Los Alamos Neutron Science Center, components of MaRIE will provide extreme irradiation fluxes, multiple diagnostic probes to bridge the “micron gap” between atomic scale/molecular dynamics and continuum model/integrated tests, and synthesis and characterization labs to make, measure, and model materials. This presentation will describe the challenges, approaches, and implementation timescale being developed for MaRIE, and engender input and interest by the scientific user community.

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