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**Matter in Extreme Conditions Instrument with LCLS for the study of High Energy Density Physics** HAE JA LEE, BOB NAGLER, JEROME HASTINGS, SLAC National Accelerator Laboratory, RICHARD W. LEE, Lawrence Livermore National Laboratory — Understanding the fundamental physics determining the equation of state and electronic transport properties of matter in extreme conditions (MEC) is of paramount importance to the high energy density community. With the very recent advent of a high peak brightness x-ray free electron laser source, the LCLS, we are constructing the MEC instrument that will cover a wide range of the extreme conditions phase space. The research areas that this instrument will address include warm dense matter, equation of state, hot dense matter, behavior of high-pressure materials, and phenomena of solid materials under extreme conditions. Here, we present the details of the MEC instrument.

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