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Diagnosing Electrode Surfaces on the Z-Machine Using Optical Spectroscopy SONAL PATEL, MARK JOHNSTON, DAVID BLISS, KEVEN MACRUNNELS, DANIEL SCOGLIETTI, GEORGE LAITY, MICHAEL CUNEO, Sandia National Laboratories — Currently, optical spectroscopy is used on the Z-machine to characterize electrode surface conditions and plasma formation during the Z power pulse. Such measurements are needed to inform theory and simulation efforts to design next-generation pulsed power machines. Several diagnostic techniques and resulting measurements will be discussed, including surface electron densities using Stark broadened line emission from passive dopants, radiance estimates from absolutely calibrated streak spectra, and low temperature (under 5000 K) measurements of cathode surfaces using high gain calibrated avalanche photodiodes. Additional capabilities using laser activated dopants that are presently being developed to probe regions with lower electron densities (less than 10^{17} cm^{-3}) will also be described. * Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525.

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