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Characterization Studies of Microchannel Plates for Use in High-speed, Time-gated X-ray Cameras[1] MING WU, CRAIG KRUSCHWITZ, KEN MOY, National Security Technologies, LLC, GREG ROCHAU, Sandia National Laboratories — X-ray detectors based on straight-channel microchannel plates (MCPs) are a powerful diagnostic tool for two-dimensional, time-resolved imaging and time-resolved X-ray spectroscopy in the fields of laser-driven inertial confinement fusion and fast Z-pinch experiments. Understanding the behavior of MCPs as used in such detectors is critical to understanding the data obtained. This presentation reports on recent efforts to characterize MCPs under direct current and pulsed voltage bias and in both saturated and unsaturated regimes. Experiments have been performed using an intense, short-pulse (<1 ps full-width half-maximum) ultraviolet laser. These data are compared to the results of a Monte Carlo code we have developed to describe MCP electron cascade dynamics. We present results from measurements and simulations of MCP gain, saturation behavior, gate profiles, and spatial resolution. In general, good agreement between the experimental data and simulations was obtained.

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