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Studies of MCP Sensitivity to 250 eV to 25 keV x-rays: Comparisons of Monte Carlo Simulations and Experimental Results MING WU, Sandia National Laboratories, CRAIG KRUSCHWITZ, National Security Technologies, Los Alamos Operations, KEN MOY, National Security Technologies, Specail Technology Lab, GREG ROCHAU, Sandia National Laboratories, SANDIA NATIONAL LABORATORIES TEAM, NATIONAL SECURITY TECHNOLOGIES, INC. TEAM — We present results of Monte Carlo simulations of microchannel plate (MCP) response to x-rays in the 250 eV to 25 keV energy range as a function of x-ray energy, impact angle, and x-ray flux. X-ray penetration through multiple MCP pore walls is increasingly important above 5 keV and the effect of this penetration on MCP performance is studied. In agreement with past measurements, it is found that the angular dependence of MCP sensitivity with angle changes from a cotangent dependence to angular independence as x-ray energy increases. It is also found that the MCP gain sensitivity with voltage decreases for higher x-ray energies. Finally, it is found that for x-rays incident at zero degrees relative to the MCP surface normal, spatial resolution shows little dependence on x-ray energy, but that spatial resolution degrades for higher x-ray energies as the angle of incidence relative to the surface normal increases. Dynamic range of MCP in this energy range is also examined. Simulation results are compared to recent experimental measurements for 6-25 keV x-rays. The experiments were performed on the X15 beamline at the National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory. Agreement between simulations and experiments is generally very good.

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