

OSWALD SIEGMUND

Space Sciences Laboratory, U.C. Berkeley

ADVANCES IN MICROCHANNEL PLATE DETECTORS FOR HIGH SPATIAL AND TIMING RESOLUTION EVENT SENSING

Microchannel plate imaging detectors with photon/particle counting capability have been employed for numerous applications in spectroscopy and imaging. Recent advances in microchannel plate and photocathode materials and processes have begun to enhance the performance and scope of these tools. A novel development of borosilicate glass microchannel plate (MCP) fabrication technology also promises to facilitate the development of electronic readout detectors to large sizes (20 cm). Using borosilicate glass tubes, MCPs with 40 μm and 20 μm pores have been made in 33mm and 20 x 20 cm formats. To make functional MCPs resistive, and electron emissive, layers are deposited by atomic layer deposition. Initial tests are very encouraging, with results similar to conventional MCPs. Cross delay line readouts and cross strip readouts have also been implemented with spatial resolutions down to 10 μm and timing of <100 ps. We will discuss the potential of these advances and their application to large format devices up to 20 x 20 cm, improvements in secondary emission coefficient and its effect on detection efficiency, and results for new materials providing longer lifetimes.