TIPP '14

Contribution ID: **198**   Type: **Oral**

Large Area Microchannel Plates for LAPPD™

Thursday 5 June 2014 16:10 (20 minutes)

Manufacturing plans for "next generation"microchannel plates (MCPs) and the technical advantages enabled by this evolving technology will be presented. The Large Area Picosecond Photodetector (LAPPD™) is an MCP based photodetector, capable of imaging, with high spatial and temporal resolution in a hermetic package with an active area of 400 square centimeters. A key component of LAPPD™ is a chevron pair of large area (203 mm x 203 mm) MCPs. The manufacture of these large-area high performance MCPs has been enabled by the convergence of two technological breakthroughs. The first to be presented, is the ability to produce large blocks of hollow, micron-sized glass capillary arrays (GCAs) developed by Incom Inc. The Incom process is based on the use of hollow capillaries in the glass drawing process, eliminating the need to remove core material by chemical etching. The arrays are fabricated as large blocks that can be sliced to form large area wafers, without regard to the conventional limits of L/d (capillary length / pore diameter). Moreover, borosilicate glass is less expensive than the prior-art leaded glass, and is more environmentally friendly. The second breakthrough to be presented is the advent of atomic layer deposition (ALD) coating methods and materials to functionalize GCAs to impart the necessary resistive and secondary emission properties suitable for large area detector applications. Recent results demonstrating the high performance, uniformity and long term stability of the current MCP product under various operating conditions will be presented.

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Session Classification: I.d Photon

Track Classification: Sensors: 1d) Photon Detectors