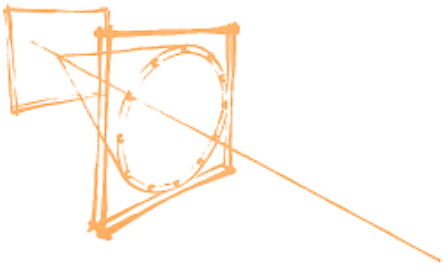

ID de Contribution: **72** Type: **Oral presentation**

Development of Sub-Nanosecond, High Gain Structures for Time-Of-Flight Ring Imaging in Large Area Detectors

mercredi 5 mai 2010 11:35 (25 minutes)

Microchannel plate photomultiplier tubes (MCP-PMTs) are compact, imaging detectors, capable of micron-level spatial imaging and timing measurements with resolutions below 10 picoseconds. Conventional fabrication methods are too expensive for MCP-PMTs in the quantities and sizes necessary for large, time-of-flight ring-imaging Cherenkov detectors (TOF-RICH) and other fast-timing large-area photo-detector applications. The Large Area Picosecond Photodetector Collaboration (LAPPD) is developing new, commercializable methods to fabricate 20cm-square thin planar MCP-PMTs at costs comparable to those of traditional photomultiplier tubes. Transmission-line readout with waveform sampling on both ends of each line allows the efficient coverage of large areas while maintaining excellent time and space resolution. Rather than fabricating channel plates from active, high secondary electron emission materials, we produce plates from passive substrates, and coat them using atomic layer deposition (ALD), a well established industrial batch process. In addition to possible reductions in cost and conditioning time, this allows greater control to optimize the composition of active materials for performance. A cross-divisional effort within Argonne National Lab has been formed to fabricate and test ALD-activated channel plates, using a wide variety of chemistries. Work between the High Energy Physics Division and the Advanced Photon Source has produced an advanced channel-plate testing facility with particularly unique capabilities for testing the performance of ALD activated microchannel plates in the time-domain. We present details of the MCP fabrication method, and preliminary results from testing and characterization facilities at Argonne. Brief Preliminary results will also be presented on the reconstruction capabilities for neutrino events in future generations of water Cherenkov detectors using precision measurements of both the time and position for each radiated photon.

Please indicate ”poster” or ”plenary” session. Final decision will be made by session coordinators.

plenary

Auteurs principaux: Dr WETSTEIN, Matthew (Argonne National Laboratory / Enrico Fermi Institute, University of Chicago); Dr SIEGMUND, Oswald (University of California)

Co-auteurs: Prof. FRISCH, Henry (University of Chicago); Dr MCPHATE, Jason (University of California); Mlle JELINSKY, Sharon (University of California)

Orateur: Dr WETSTEIN, Matthew (Argonne National Laboratory / Enrico Fermi Institute, University of Chicago)

Classification de Session: Photon detection for Cherenkov Counters - vacuum based devices

Classification de thématique: Photon detection for Cherenkov counters