

Development of a Large Area Photodetector with a Fast Phosphor Anode

Thursday 23 August 2012 13:15 (15 minutes)

The next generation neutrino experiments like the Hyper-Kamiokande requires cost-effective ways to instrument large volumes with $O(10^{4-5})$ pieces of photodetectors. Such photodetectors are required to have good effective quantum efficiency, large active area, high gain to allow use of simple and cheap electronics, and good time resolution to reconstruct the wave front of the Cherenkov cone.

A concept of the hybrid photodetector with luminescent anode has been developed as one of ways to meet the above goals. The large advantage of the concept is the simplicity in the structure, where there is no active component, such as dynode complex or photo-diode inside the vacuum, that would lead to significant reduction of cost in the mass production.

We are developing a large area photodetector with a fast phosphor "J9758", which has a decay time constant of 500 ps, and the emission peak at around 420nm. In this talk, we will present the results of performance tests, using a 8-inch prototype photodetector.

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Session Classification: Photo-sensor Development