

A Glass Study to Reduce Backgrounds of the Hyper-Kamiokande Photodetectors

Tuesday, 27 November 2018 18:14 (2 minutes)

Hyper-Kamiokande is a large water Cherenkov detector planned in the near future. A fiducial volume of Hyper-Kamiokande is about twenty times larger than Super-Kamiokande.

It is equipped with forty thousands of a 50 cm photomultiplier tube (PMT), R12860 by Hamamatsu Photonics K.K.

The PMT has a high quantum efficiency, faster time response, better charge resolution and a higher detection efficiency with a stable mechanical structure, compared to the PMTs in Super-Kamiokande.

The detection efficiency of the R12860 is double by the Super-Kamiokande PMTs, but the obtained current dark hit rate is relatively high compared to the Super-Kamiokande PMT.

A reduction of the dark hit rate can improve physics sensitivities of Hyper-Kamiokande.

Since a light derived from PMT glass could contribute to the dark hit rate, I investigate the light background of the PMT glass.

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Session Classification: Poster session