

Cherenkov radiation influence decreasing in scintillator-based fiber-optic detectors

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The one of possible ways to protect photosensitive elements of scintillation detectors from the ionizing radiation is removed them from irradiation area. In this case the link between scintillation and photosensitive parts is could be made by optic waveguides. Those devices were named scintillator-based fiber-optic detectors. The one of main problems of that systems is Cherenkov radiation, which appears as reaction scintillator and fiber-optic line on a powerful ionization irradiation.

In this work the scintillator-based fiber-optic detector with up to 100 meters multi-fiber line was shown. The detector feature was based on using signal and reference channels which forming symmetrical measuring scheme. The difference between channels is the sensitive media in the reference one. For reference channel we used the same scintillator polymer structure without wavelength-shifters compounds. We demonstrate that in this case Cherenkov radiation contribution in a measured signal could be fixed and effectively reduced by simple calculations.