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Primary Scintillation Yield in Xenon –Further Experimental Studies

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Xenon scintillation has been extensively used in recent particle physics experiments. However, information on primary scintillation yield is still scarce and dispersed. The mean energy required to produce a VUV scintillation photon (Wsc) in gaseous xenon has been measured in the range of 30-120 eV. Lower Wsc-values are often reported for alpha particles compared to electrons produced by gamma or x-rays, being this difference still not fully understood.

We carried out a systematic study on the absolute primary scintillation yield in xenon at 1.2 bar, using a Gas Proportional Scintillation Counter. A simulation model of the detector's geometric efficiency was benchmarked through the primary and secondary scintillation produced at different distances from the photosensor. Wsc-values were obtained for gamma- and x-rays with energies in the range from 5.9-60 keV and for 2-MeV alpha particles. No significant differences were found between alpha particles and electrons.

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