

Novel approach to Xenon optical TPCs: the presence of Neutral Bremsstrahlung

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We have measured, for the first time in pure Xe, non-excimer-based secondary scintillation, Neutral Bremsstrahlung (NBrS), in a dedicated setup based on a Gas Proportional Scintillation Counter.

The emission of NBrS by drifting electrons occurs even for electric field values below the gas excitation threshold. We have shown the presence of NBrS in the NEXT-White TPC, at present the largest optical HPXe-TPC in operation.

Moreover, for field values above 1 kV/cm/bar, as typically employed for electroluminescence (EL), there is consistent evidence that NBrS is present with an intensity about two orders of magnitude lower than conventional, excimer-based, EL.

Our data show excellent agreement with calculations of NBrS yield.

Despite fainter than EL, in pure xenon, this new source of emission has to be accounted for in Xe optical TPCs and may play an important role in future single-phase LXe TPCs.

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