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【3007】 Novel Optical Time Projection Chamber for Neutrino Experiments

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Excellent particle detection momentum threshold, together with cost-effective scale-up prospects, make the proposed TPC, a strong candidate for reducing the systematic errors in future neutrino oscillation experiments. Thousands of photons per primary electrons are produced through a gas electron multiplier. These photons, normally in the UV range, are shifted to visible using a PEN wavelength shifter. Using a simulation that describes all the critical physical phenomena in photon transport, it is shown that hundreds of photons can be collected by a multi-photon pixel counter. Minimising optical aberrations, the number of photons per channel was demonstrated to be larger than the dark-count background, and therefore tracks can be reconstructed.

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