

Development of Spherical Time Proportional Counter

Neutrino physics and dark matter detection are frontier topics of current particle physics. Good rock shielding, ultra low background and ultra low energy threshold are key to detect signals from neutrino and WIMPs scattering in underground experiments successfully. A novel large volume spherical proportional counter has been set up in IHEP. The detector adopted an ultra small front-end capacitor which can provide ultra low energy threshold (30 to 200eV) with high energy resolution and a single center dynode that creates a strong radial electric field. This simple and robust structure enables the signal to be read out through a single electronic channel. Charges deposited in the gaseous vessel drift to the central electrode followed by amplification and collection. The signal waveform response can be used for possible particle identification and particle track reconstruction. The detector possesses the advantages of easy-handling and cost-effectiveness. We will show the pre-test results and performance of the detector possibly used for future neutron background, neutrino and dark matter measurement.

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Track Classification: Dark Matter Detectors