

# The 8th International Conference on Micro Pattern Gaseous Detectors (MPGD2024)



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## 16. An improve of performance in MTPC with waveform deconvolution technique

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The multi-purpose time projection chamber (MTPC), which is designed for measuring neutron nuclear data of varied field, is fabricated at China Spallation Neutron Source (CSNS). Its drift region is flexible, ranging from 70mm to 150mm. Ionization electrons are avalanched and collected via a resistive Micromegas detector with 1521 readout channels. As timing precision plays an important role in particle 3D track reconstruction as well as in time-of-flight method (for measuring neutron energy), we have developed deconvolution technique combined with waveform fitting for software waveform analysis. We have modeled the anode signals which contains energy and space information of detected particles. T0 of signals are obtained by utilizing FFT deconvolution technique. Data from  ${}^6\text{Li}(n,t)\alpha$  experiment is used to study the detector's enhanced performance. A simulation of MTPC signals and noises is applied to estimate the timing resolution and timing bias of our software. The result shows that the timing precision of analysis result is significantly improved.

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