

## uTPC analysis for neutron detection

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Several instruments at the European Spallation Source (ESS) will require small to medium sized neutron detectors with an unprecedented spatial resolution and superb local rate capabilities. Micro-Pattern Gaseous Detectors (MPGDs), devices widespread in the High Energy Physics community and in the collider experiments, are very good candidates to meet these requirements. The typical range in gas of the secondary charged particles produced by the neutron capture on the converter material is at least of the order of 1cm. This is apparently in contrast with the requirements of an uncertainty of the neutron conversion position of  $\pm 200\mu\text{m}$ . A data analysis techniques based on the principle of the Time Projection Chamber (TPC) was developed, and the proof of principle demonstrated with the data from a laboratory setup with  $^{241}\text{AmBe}$  source and a GEM detector. During a neutron test beam at the IFE research reactor in Norway, the so called uTPC analysis was successfully applied to data acquired with a resistive Micromegas. The analysis improves the position resolution from 1mm to better than  $200\mu\text{m}$  for  $^{10}\text{B}$  as conversion material. This technique is already used by the ATLAS collaboration to improve the reconstructed position of muon interaction in Micromegas detectors.

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