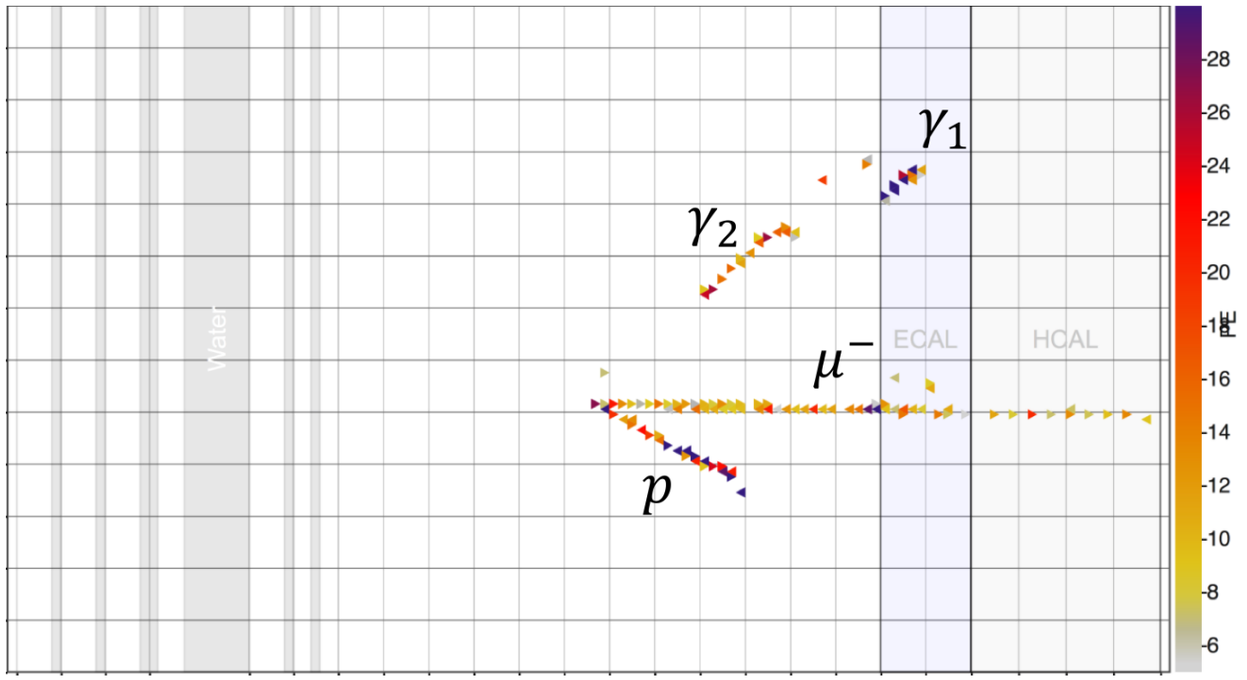
# Measuring nuclear effects in pionic semi-exclusive final states using the MINERvA Detector

**Nuclear Effects** are one of the **dominant systematics** in neutrino oscillation measurements

**NOvA** and **DUNE** rely on **Multi-GeV** neutrino beams leading to many-particle final states




By considering $\nu_\mu n \rightarrow \mu^- p \pi^0$ interactions requiring at least **one of each hadron**

**We probe nuclear effects in many-particle final states in a multi-GeV neutrino beam**


UNIVERSITY OF OXFORD

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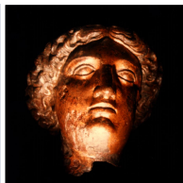
**Wednesday Session, Poster 112**



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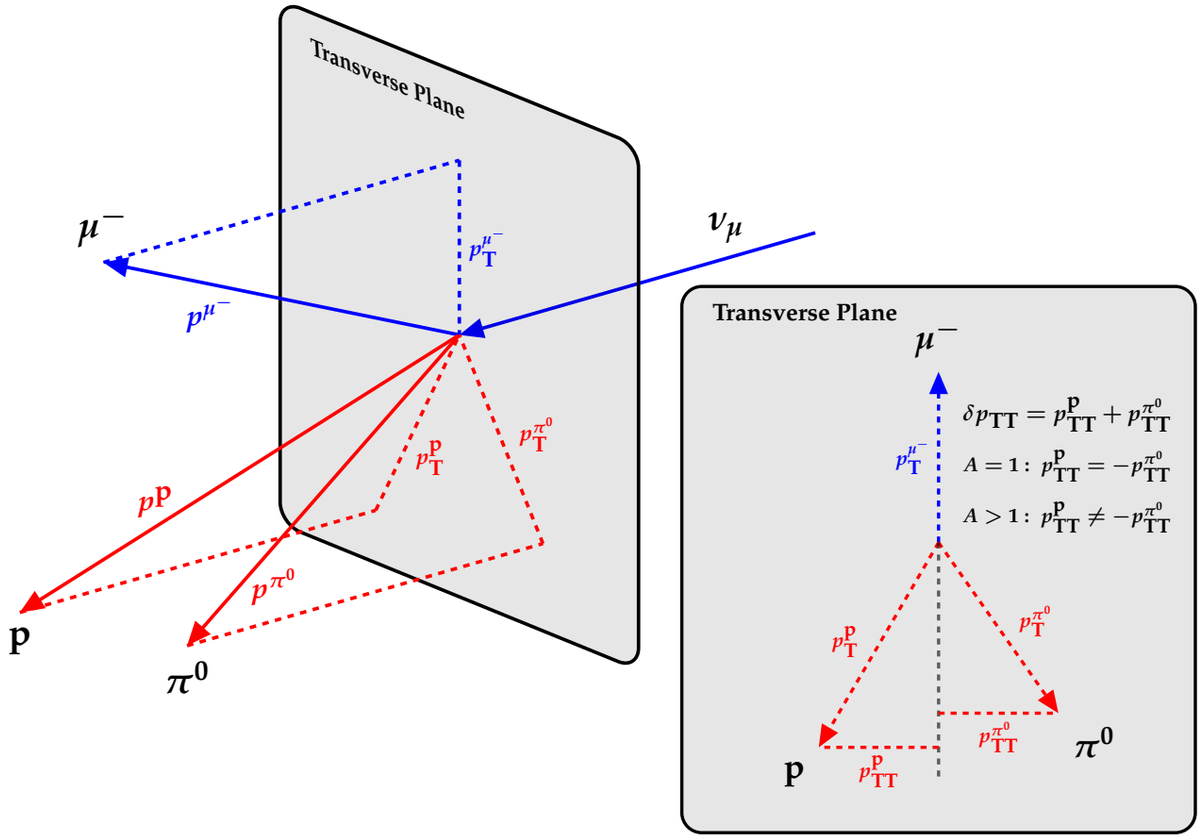


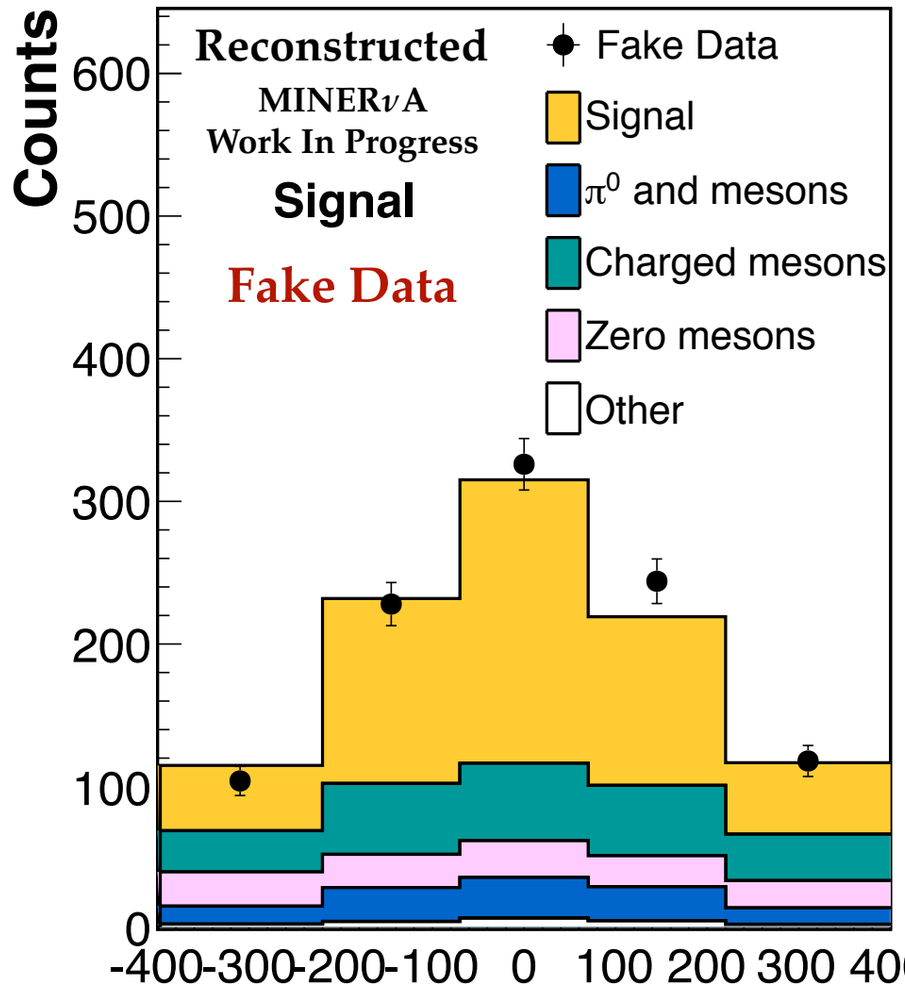


**Double Transverse Momentum** [1]
acts as a probe to nuclear dynamics, namely

**Nucleon Initial State**
and
**Final State Interactions**


[1] X-G. Lu *et al.* Phys. Rev. D92, no. 5, 051302 (2015)



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