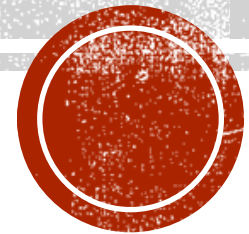


Exclusive Meeting — Deuteron Tagging

Jan Vanek

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11/03/2025

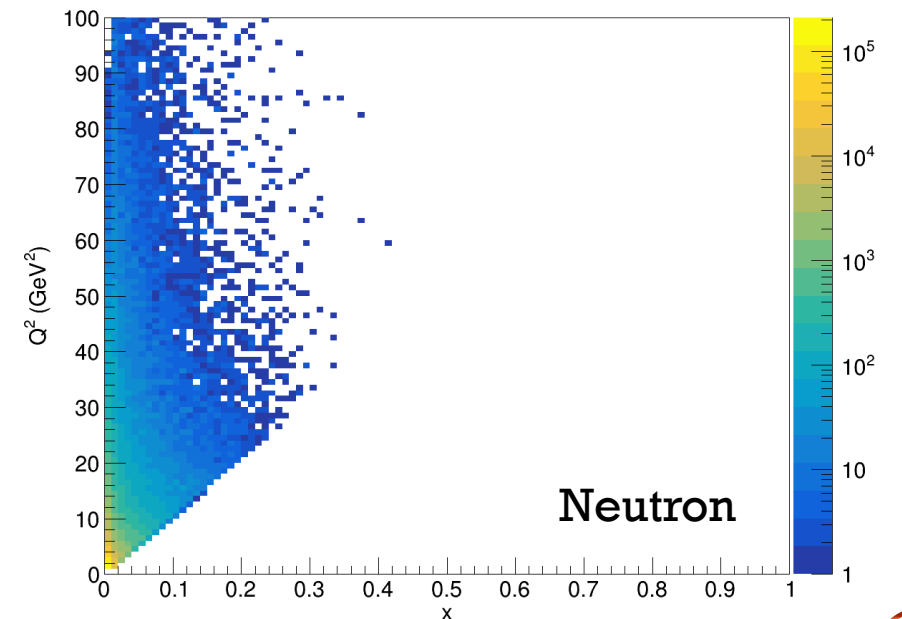
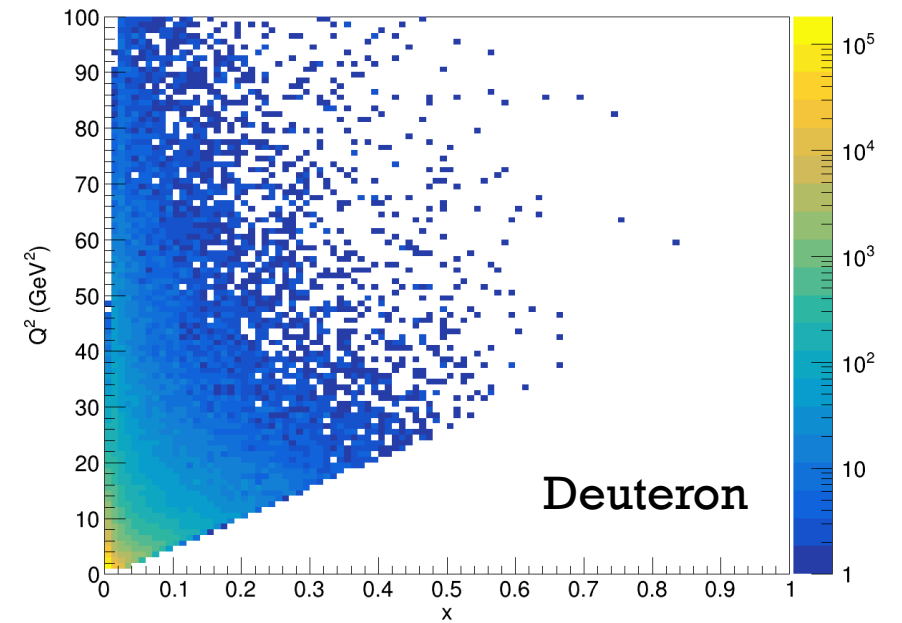


OVERVIEW

- Extraction of basic kinematic distributions from HepMC simulation output
 - True MC information, without any beam or detector effects
 - Simulation setup:
 - eD DIS events at $10 \times 130 \text{ GeV}^2$ (simulation by Alex)
 - Scattering on neutron, tagging of protons
 - Scattered electron: x vs. Q^2
 - Spectator proton: p_T and p_T^2

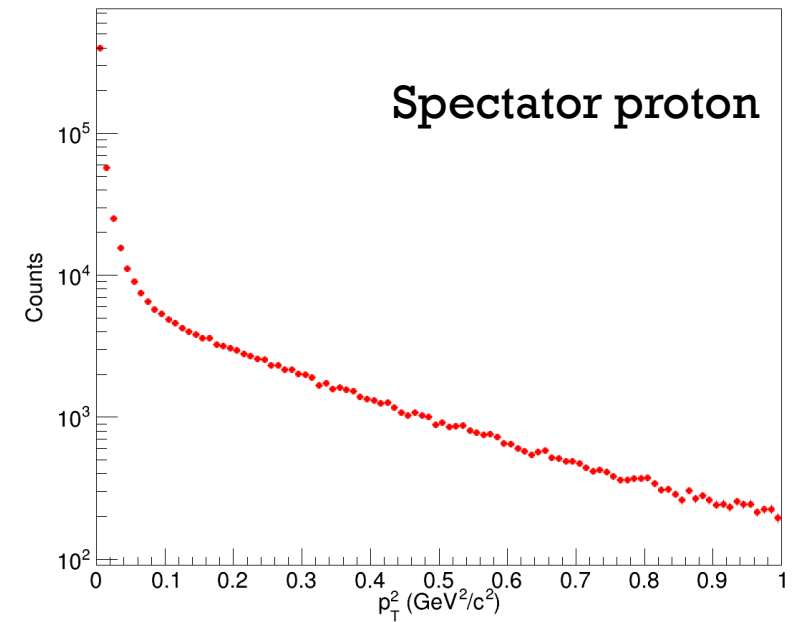
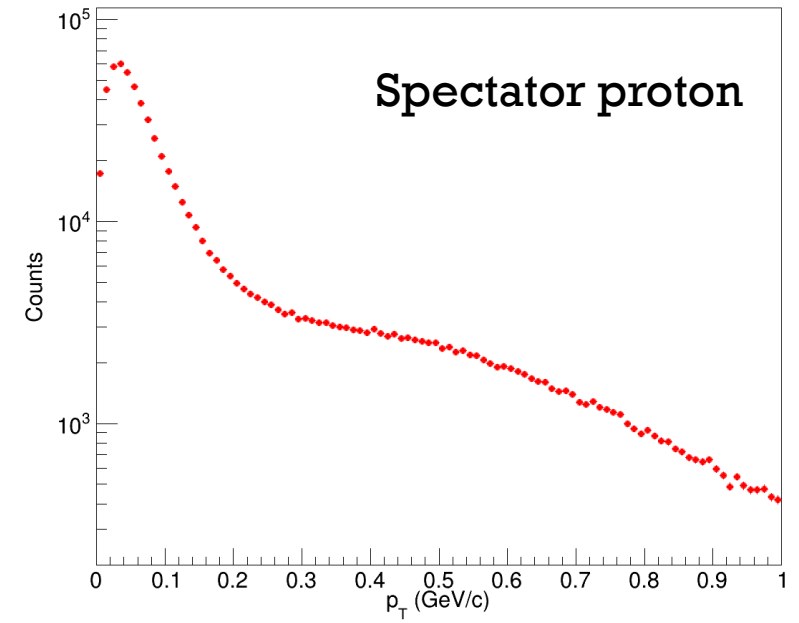
ELECTRON KINEMATIC PLOTS

- Scattered electron kinematic distribution
- $Q^2 = -q^2 = -(p_{e,beam} - p_{e,scat})^2$
 - p_e - electron 4-momenta before and after scattering
- $x = \frac{Q^2}{2 P \cdot q}$
 - P - 4-momentum of deuteron or nucleon
- (top) x from deuteron 4-momentum
- (bottom) x from neutron 4-momentum



SPECTATOR PROTON p_T

- Spectator proton kinematics
 - (top) p_T
 - (bottom) p_T^2



SUMMARY AND OUTLOOK

- First basic kinematic distributions from HepMC
 - Scattered electron
 - Spectator proton
- Outlook:
 - By next week:
 - Start with reproduction of tagging specific plots for true MC directly from HepMC output
 - Longer-term goal
 - Reproduce TDIS analysis from A. Jentsch, Z. Tu, C. Weiss: [Phys. Rev. C 104, 065205](#), using the new simulation setup