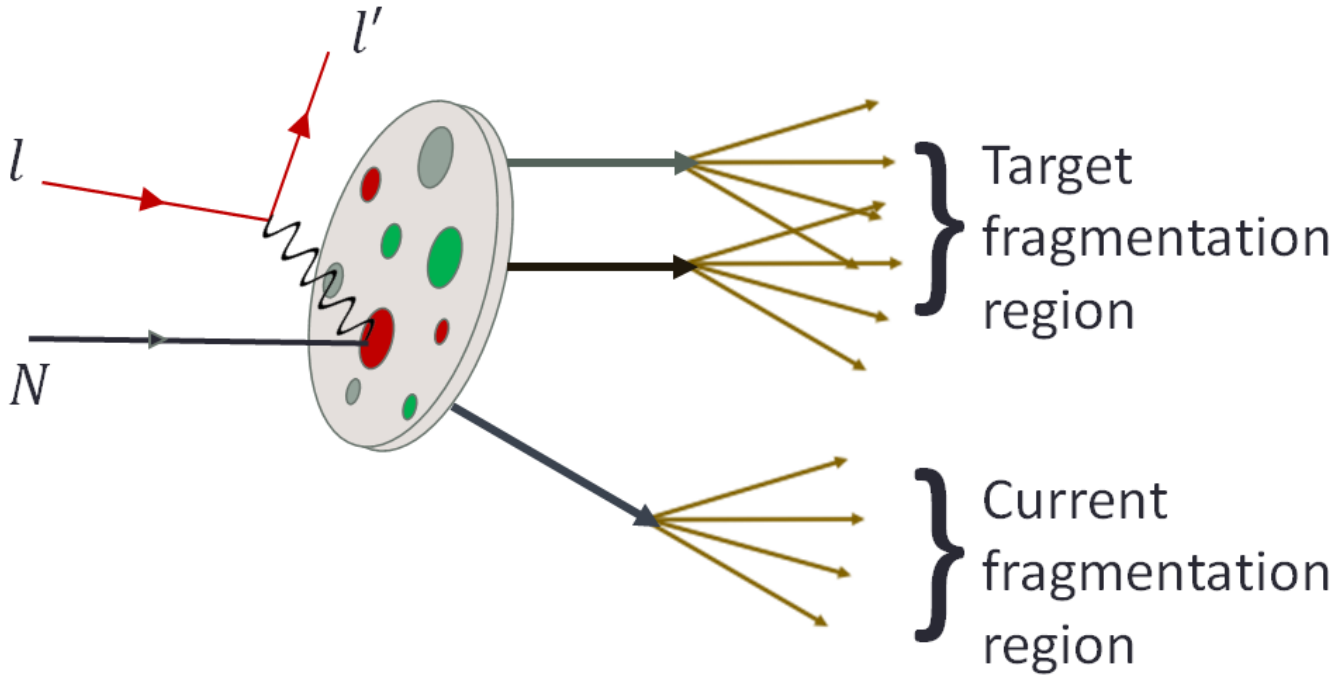
Tools for understanding semi-inclusive deep-inelastic scattering measurements

Tetiana Yushkevych
Odesa Polytechnic National University

Mentor: Dr. Markus Diefenthaler
(Jefferson Lab, USA)

Odesa Polytechnic National University

Investigating the Inner Structure of the Proton



(quark well separated from target remnant)

Figure 1: Schematic diagram of semi-inclusive deep inelastic scattering (SIDIS): a high-energy electron knocks a quark out of the nucleon. The quark or spectators from the proton forms a pion in the final state, which is detected along with the scattered electron

Goal for the project

- Plot and analyze new graphs to understand whether changing the range of values for non-perturbative parameters affects the quality of the description of the experiment within one of the four regions shown below.
- To study the influence of these parameters on the affinity results and see how reliable these results are in order to guide experiments and phenomenological studies of nucleon structure.

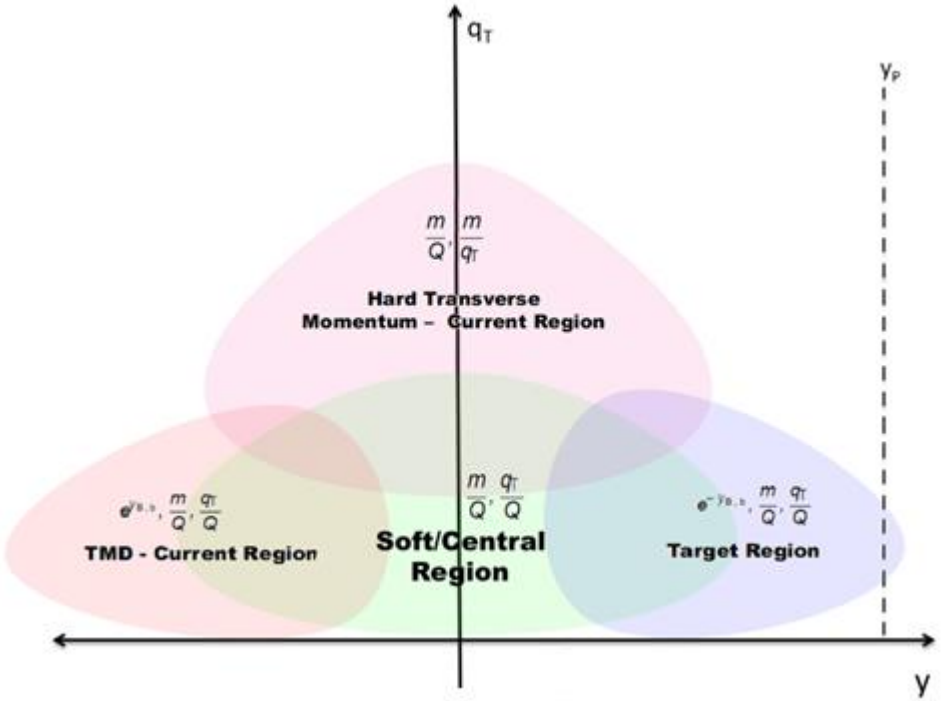


Figure 2: New affinity tool to quantify the proximity of any experimental kinematic bin to a particular hadron production region.

Current progress

- All the necessary literature for understanding nuclear theory in experiment has already been studied
- Familiarized with Jupiter Notebook and getting started with it
- The limits of parameter change were chosen and the modifying the Notebook for another experiment and kinematic region was started.

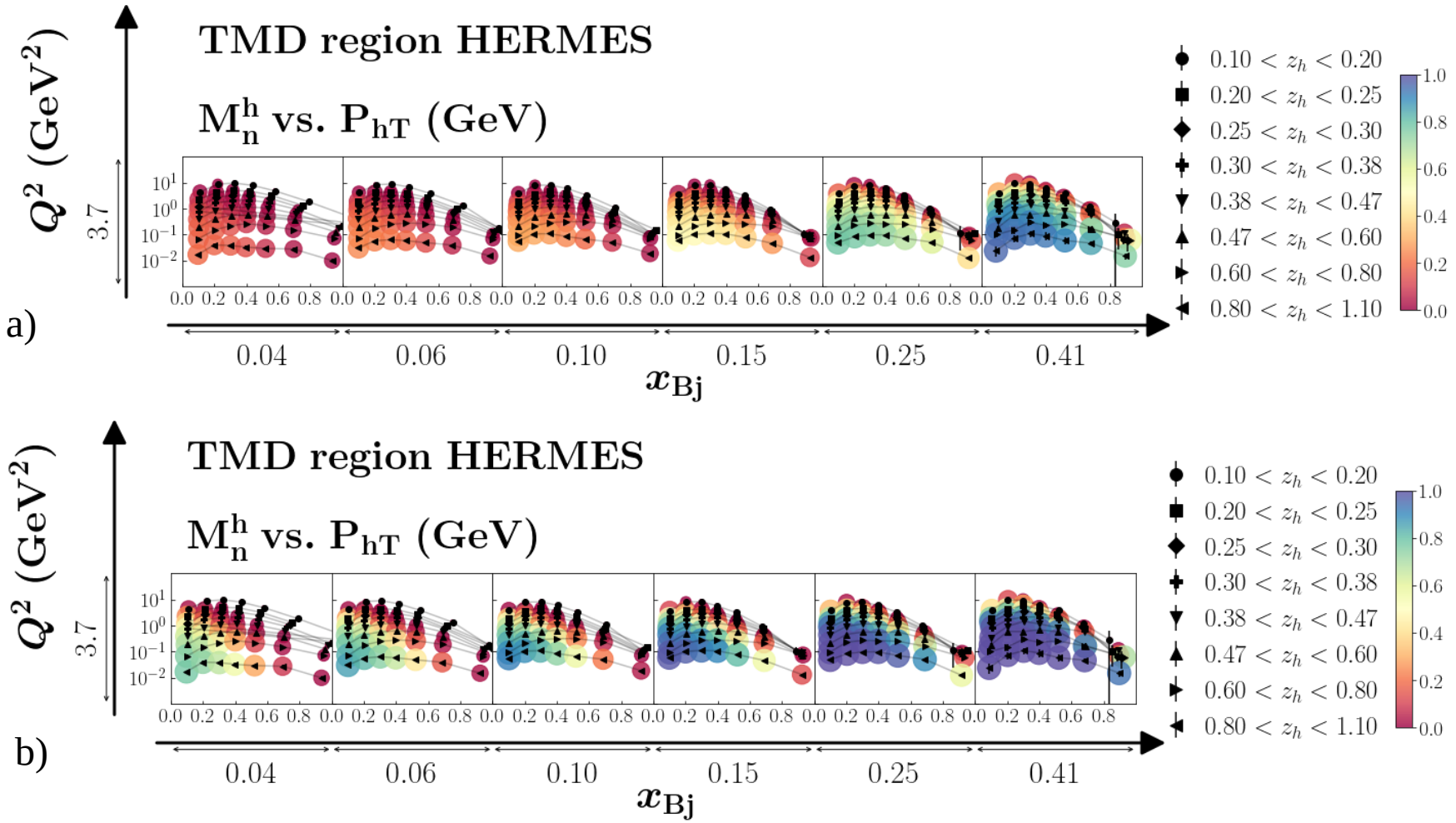


Figure 3: Data bins as a function of P_{hT} and z_h. The color bar represents the affinity to the TMD region for the limits of parameter values from 0 to mass of proton

Thank you!