

# Physics & Astrophysics Colloquium

## Nuclear Femtography

### Probing the Inside of the Nucleon

Dr. Kyle Shiells

Department of Physics and Astronomy, University of Manitoba

4:00 PM Friday, October 14, 2022, Room 211, Witmer Hall

#### **Abstract:**

Around the turn of the millennium, exciting new ways to study hadronic structure were proposed. Generalized parton distribution functions (GPDs) hold unprecedented information about the structure of hadrons. For instance, they can tell us how the proton and neutron acquire their observable spin of  $1/2$  through what are called spin sum rules. In the first part of this talk I will discuss some of the important physics of GPDs, including spin sum rules, focusing on ones which are most accessible experimentally. GPDs however, can only be probed from a relatively new line of challenging deeply virtual exclusive scattering experiments. One such flagship process for doing so is Deeply Virtual Compton scattering (DVCS). I will highlight the relationship between these observables and the GPDs. This will include a deep phenomenological look at how one can attain GPDs from DVCS. The greater scheme of the global extraction of GPDs will also heavily rely on available and upcoming lattice QCD data, making it unique to the previous global analyses seen in the extraction of parton distribution functions from deep inelastic scattering processes. I will discuss our approach to modelling and extracting the GPDs from these global constraints.

**Refreshments at 3:30 PM in Witmer Hall, Room 215**

For more information: Dr. Wayne Barkhouse, 701-777-3520, [wayne.barkhouse@und.edu](mailto:wayne.barkhouse@und.edu)