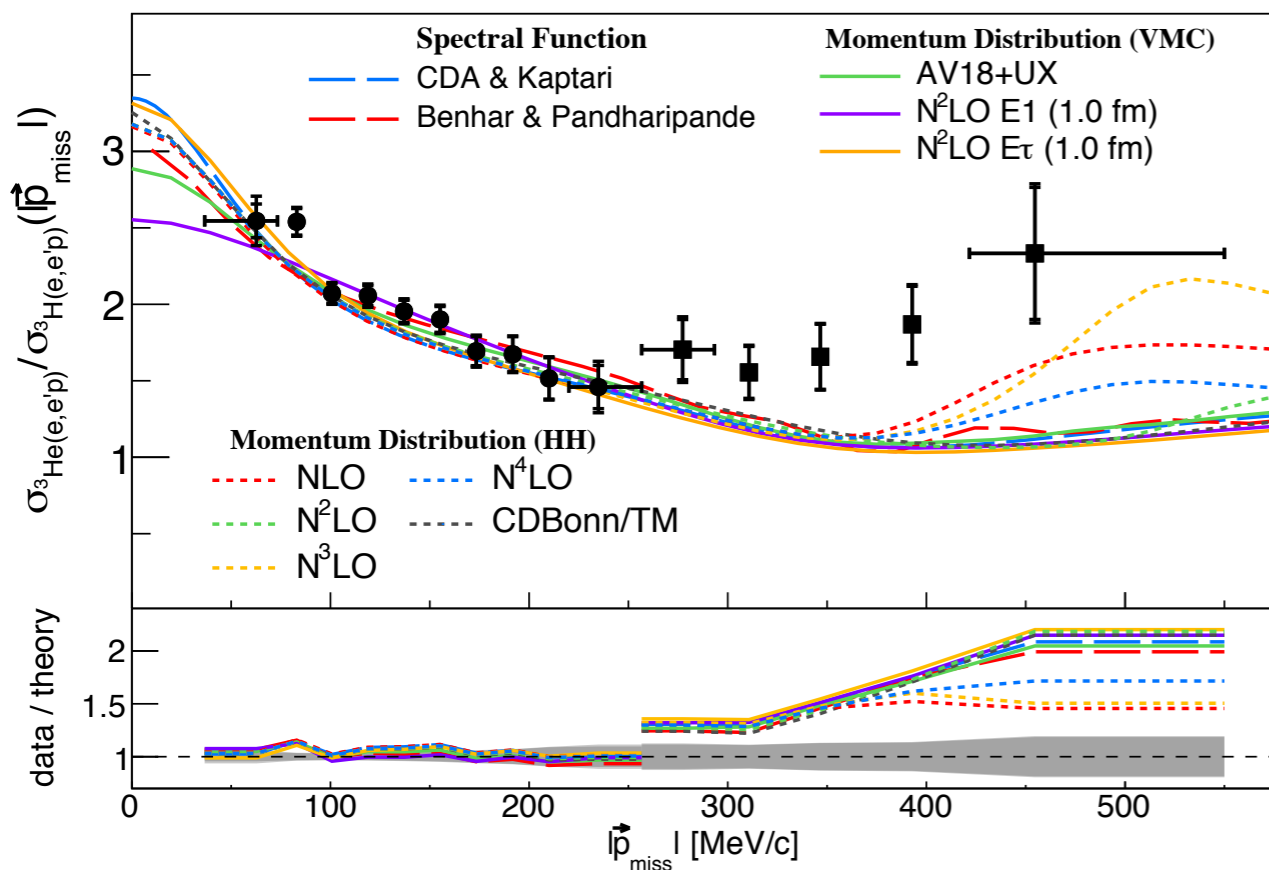


## Objectives

- We report the first measurement of the  $(e, e' p)$  reaction cross-section ratio for  ${}^3\text{He}$  relative to  ${}^3\text{H}$ , with missing momentum range of  $40 \leq p_{\text{miss}} \leq 550$  MeV/c, at large momentum transfer  $\langle Q^2 \rangle \approx 1.9$  (GeV/c) $^2$  and  $x_B > 1$ .
- The data is compared with calculations performed within the plane-wave impulse approximation (PWIA) using realistic spectral functions and momentum distributions.

## Impact

- The measurement of the  ${}^3\text{He}(e, e' p)$  and  ${}^3\text{H}(e, e' p)$  reactions is performed in kinematics where the cross-sections are expected to be sensitive to the proton momentum distribution, and two-body currents and the effects of final state interaction (FSI) are minimal.
- The measured and PWIA cross-section ratios agree within the measurement accuracy of about 3% up to the nuclear Fermi-momentum ( $\approx 250$  MeV/c), and differ by 20%–50% at higher momenta despite a four order of magnitude decrease of the momentum distribution in this range. FSI calculations using the generalized Eikonal Approximation indicate that FSI should change the  ${}^3\text{He}/{}^3\text{H}$  cross-section ratio for this measurement by less than 5%.
- The data overall supports the transition from single-nucleon dominance at low  $p_{\text{miss}}$ , towards an  $np$ -short-range-correlated pair dominant region at high  $p_{\text{miss}}$ .
- The observed difference between the  ${}^3\text{He}/{}^3\text{H}$  experimental ratio and momentum distribution ratios at large  $p_{\text{miss}}$  might arise from the loosely-constrained short-distance parts of the  $NN$  interaction.



Extracted  ${}^3\text{He}$  to  ${}^3\text{H}(e, e' p)$  cross section ratio plotted vs.  $p_{\text{miss}}$  compared with different models of the corresponding momentum distribution ratio.

## Accomplishments

- Publication: R. Cruz-Torres *et al.* (Jefferson Lab Hall A Tritium Collaboration), [Phys. Lett. B 797, 134890](https://doi.org/10.1016/j.physletb.2019.07.028) (2019)