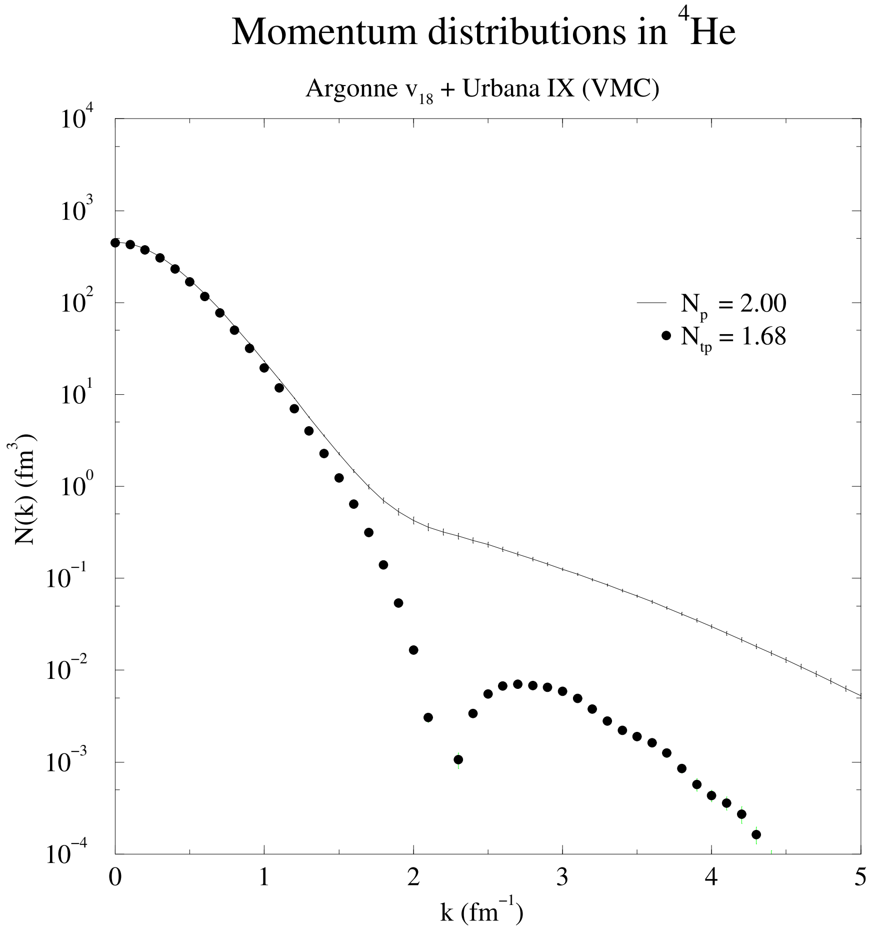
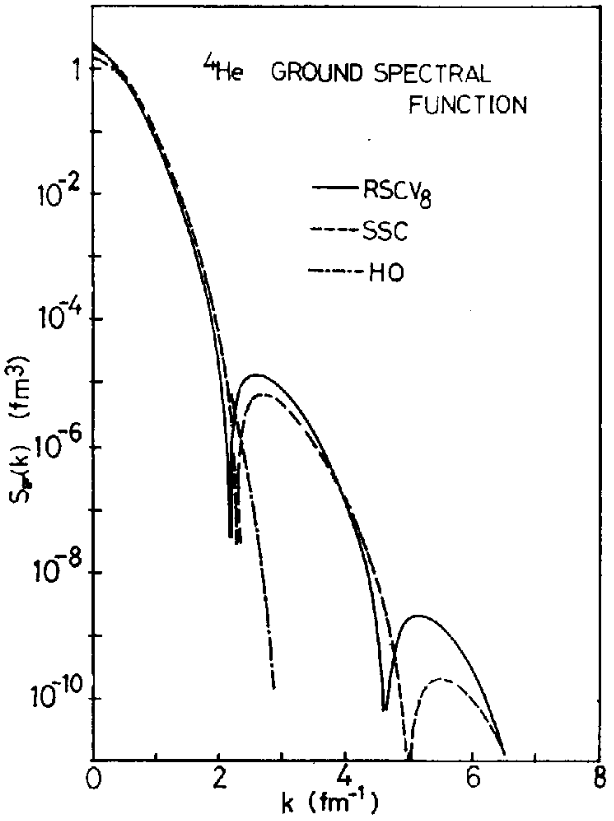
^{4}*He* $\rightarrow$ *tp Spectral Function*



R. Wiringa, VMC calculation, 1997

- Definite, "exact" prediction from state-of-the-art calculation
- high-k part:
  - high-k $\rightarrow$ short distances
  - high-k $\rightarrow$ non-mean-field physics

Deviations from Mean Field Physics

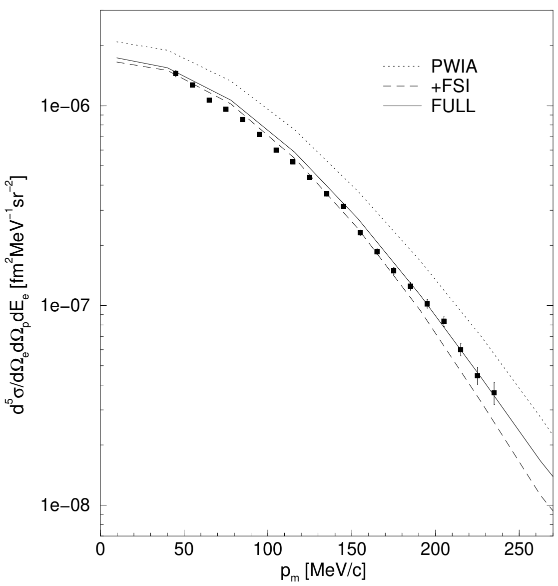


S. Tadokoro *et al*, Prog. Theor. Phys. **78**, 732 (1987)

Realistic interactions + correlations (here ATMS method) produce high-k structure; minimum position and height of second maximum sensitive to details

Probing (via ^{4}He$(e, e'p)^3$H) This Spectral Function Tests . . .

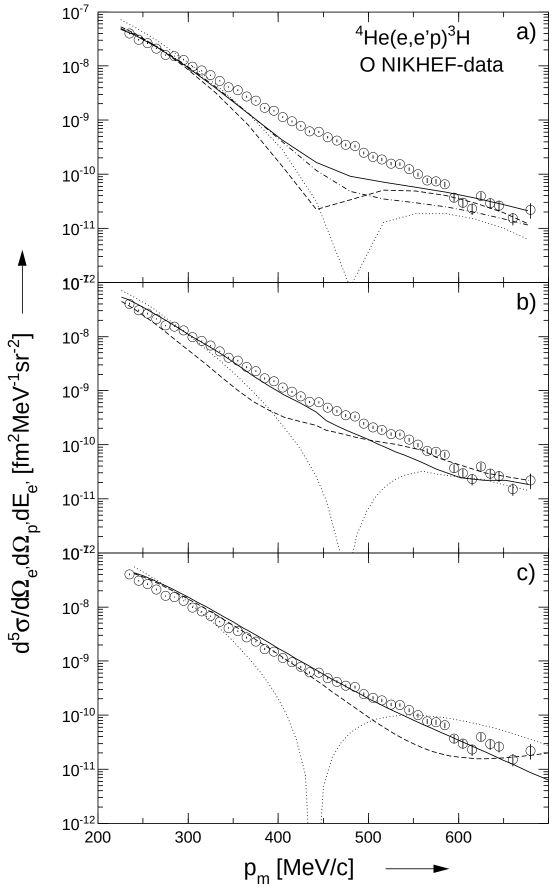
- exact calculation in untested regime
- short-range part of NN potential
- deviations from mean-field physics



K. van Leeuwe *et al*, PhD Thesis, NIKHEF 1996

- theoretical curve uses VMC wavefunctions
- agreement good in this (mean-field) region

What About High-k Region?



J.J. van Leeuwe *et al* (NIKHEF), accepted for PRL, 1998

- (mostly) FSI and MEC obscure structure
- unclear whether “agreement” at high k meaningful
- note PWIA difference (a,b) *vs.* (c) (different NN potential)

How To Suppress FSI in $(e, e'p)$?

Parallel Kinematics

- always selects minimum p_m consistent with electron kinematics
- in quasiperpendicular kinematics, rescattered low-p_m (parallel, high S) nucleons can contribute at larger p_m

Large y values

- y is minimum struck-nucleon momentum consistent with electron kinematics
- at parallel kinematics, $|\vec{p}_m| = y$
- GEA: when $|\vec{p}_m \cdot \hat{q}| > k_F$, minimal sensitivity to FSI
- $+y$ "intuitive" reasoning: when $\vec{p}_f = \vec{p}_m + \vec{q}$, probability small that anything but "PWIA" has happened

How to Suppress MEC? N^*?

Large Q^2

- kill $NN\pi$ form factor
- kill π propagator

Large Negative y Values

- smaller $\omega \rightarrow$ smaller MEC and N^* amplitudes
- rationale partly behind 97-011

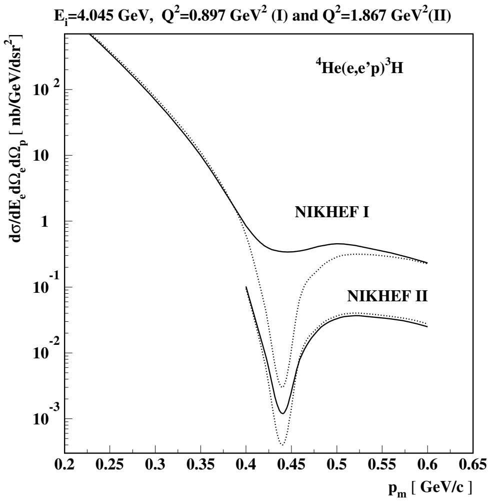
This Experiment . . .

- Emphasizes (near) parallel kinematics
- Utilizes large proton momenta
- Measures at various values of (large) y
- varies Q^2

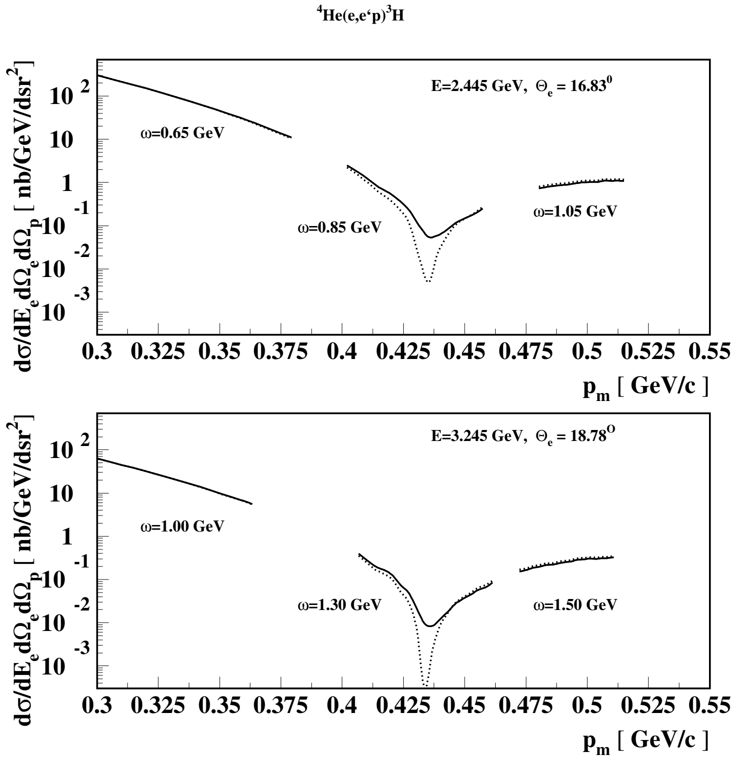
Twofold aim for kinematics choices

- test ideas about FSI and MEC suppression
- access unprobed part of $S_{tp}(k)$

Best Available Calculations*



CQΩ Kinematics, Wiringa Spectral Function



PY Kinematics

Why Another SRC Experiment?

Theoretical Advantages:

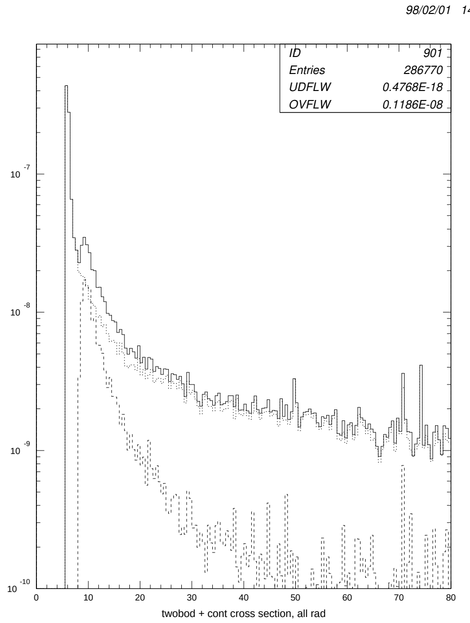
- test *definite prediction* of *state-of-the-art* calculation (others: LD approximation)
- ^{4}He: focus on s-wave, explicit SR correlations
- ^{4}He: the most dense nucleus

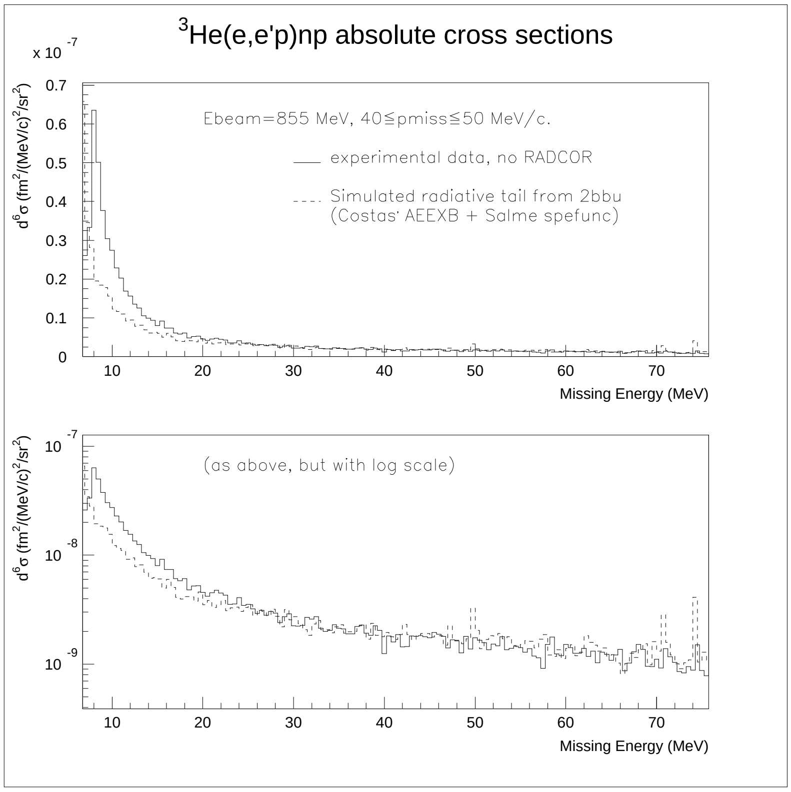
Experimental Advantages:

- don't need to do stellar job on radiative corrections
- don't have to worry about collimator scattering

Stellar Radiative Corrections

Mainz A1/93-01 Data (Florizone *et al*, MIT)





TAC Comments

Target Density Fluctuations

- $\sim$ 10% at 100 μA
- can be corrected for with dedicated studies
- assume these are part of HPHC commissioning

Count-Rate Simulations

- true that y_{tgt}-acceptance is not one number
- used ratio $\Omega_{\mathrm{exp}}/\Omega_{\mathrm{colli}}$ from 89-003 commissioning
- most of interesting data (by design) in center of acceptance $\rightarrow$ less sensitive to acceptance cutoff