

Review Talk on QCD Processes in Nuclear Matter at Jefferson Lab

Jerry Gilfoyle for the CLAS Collaboration

University of Richmond

- Introduction
- Jefferson Lab: Accelerator and End Stations.
- Overview of Program
- Selected Topics
- The Future
- Concluding Remarks



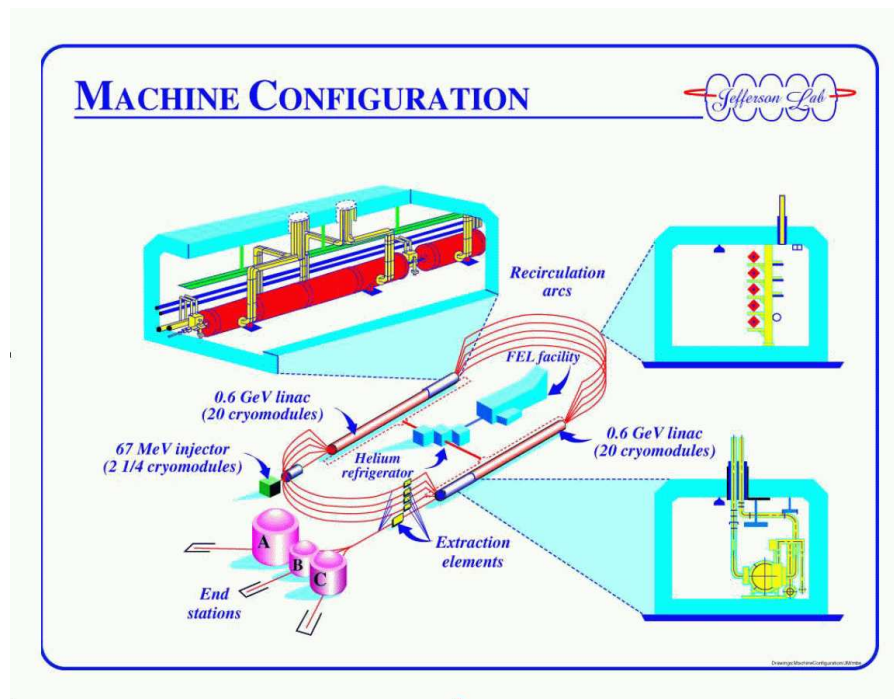
300 participants, 6 working groups, hundreds of talks

<p>[199] Review talk on QCD processes in nuclear matter at Jefferson Lab by Gerard GILFOYLE (Richmond) (E7: 16:30 - 16:50)</p>		<p>[231] Beauty in photoproduction at ZEUS by Ursula SAMSON (Universität Bonn) (Pearson: 16:30 - 17:00)</p>	<p>[97] Measurement of the longitudinal structure function FL at ZEUS by Dr. Daniel KOLLAR (Max-Planck-Institut für Physik, Munich) (Massey: 16:30 - 17:05)</p>	<p>(Department of Physics and Technology) (A1: 16:25 - 16:45)</p>
<p>[200] Status of eikonal two-loop calculations with massive quarks by Nikolaos KIDONAKIS (Kennesaw) (E7: 16:50 - 17:10)</p>	<p>[86] Tevatron Searches for Resonances Decaying to Fermion Pairs by Carsten MAGASS (RWTH Aachen) (D103: 16:40 - 16:55)</p>	<p>[232] Beauty production at CDF by Dr. Tara SHEARS (UNIVERSITY OF LIVERPOOL) (Pearson: 17:00 - 17:15)</p>	<p>[94] Measurement of the Longitudinal Structure Function FL at Low x in the H1 Experiment at HERA</p>	<p>[46] Photon-photon physics at the LHC (experimental aspects) by Muriel VANDER DONCKT (CERN) (A1: 16:45 - 17:05)</p>
	<p>[87] LHC Searches for High-Mass Resonances Decaying to Leptons or Photons by Matthias U. MOZER (D103: 16:55 - 17:10)</p>			<p>[47] Studying the BSM Higgs sector by forward proton tagging at the LHC by Dr. Marek TASEVSKY (Physics Institute Prague) (A1: 17:05 - 17:20)</p>

The Continuous Electron Beam Accelerator Facility at JLab



View of site in Newport News, Va.

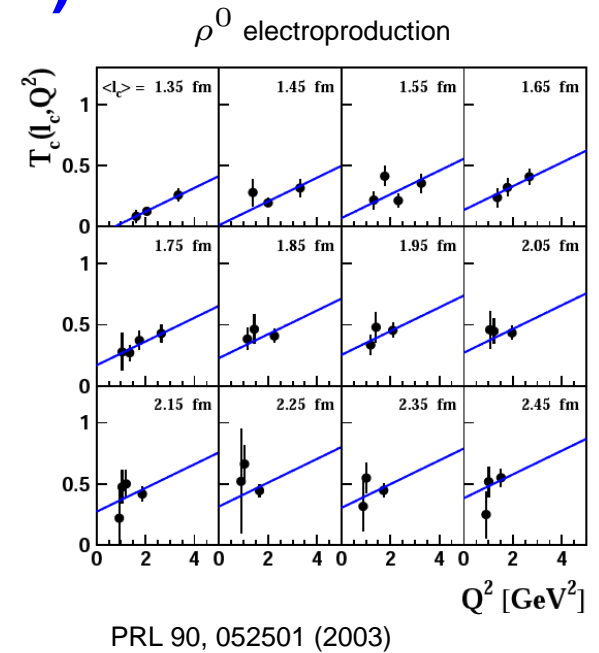


Schematic of accelerator and components.

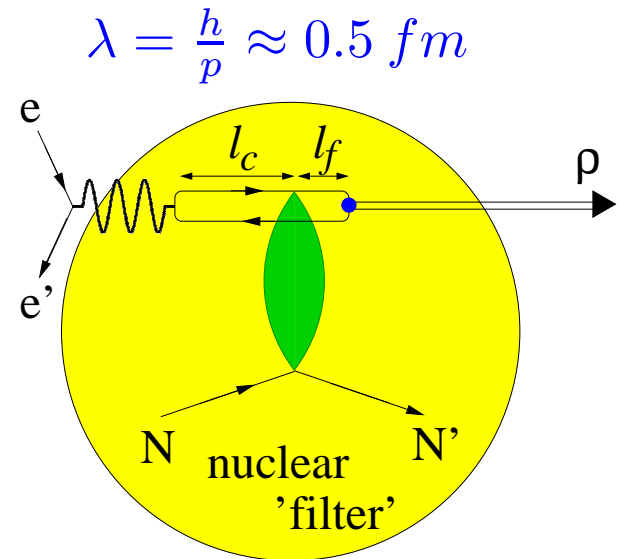
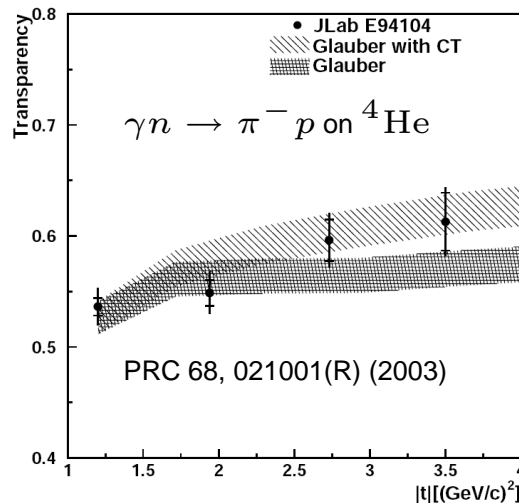
Superconducting Electron Accelerator (338 cavities), 100% duty cycle,
 $I_{max} = 200 \mu A$, $E_{max} = 6 GeV$, $\Delta E/E = 10^{-4}$, $P_e > 80\%$, 1500
physicists, over 30 countries, operational since end of 1997.

Color Transparency (CT)

- Small, point-like, color-neutral, hadron formed inside a nucleus and passes through with little interaction.
- Central (and surprising!) prediction of QCD.
- Signature of transition from hadronic to quark-gluon description of nuclei.
- More recently, necessary condition for factorization of meson electroproduction and extraction of generalized parton distributions.
- Observed at 'high' momentum and/or energy transfer.

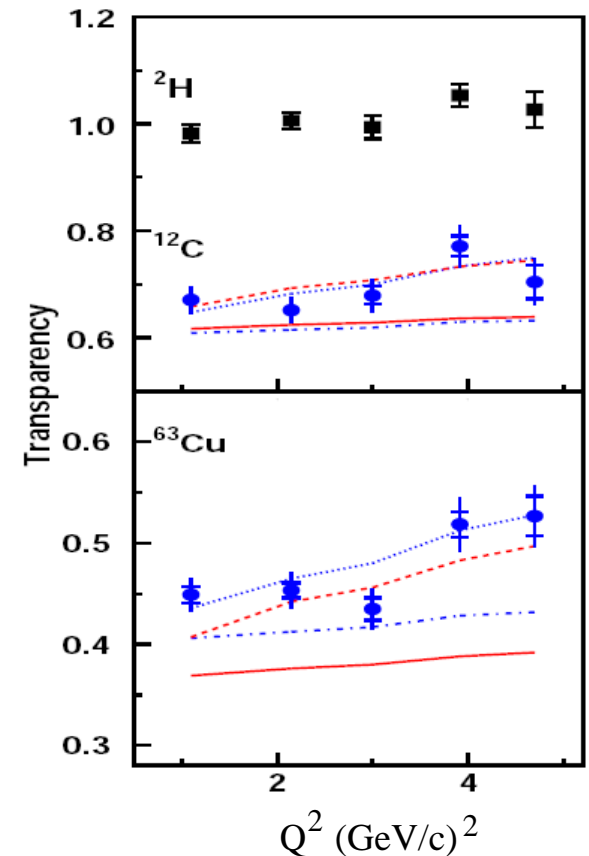
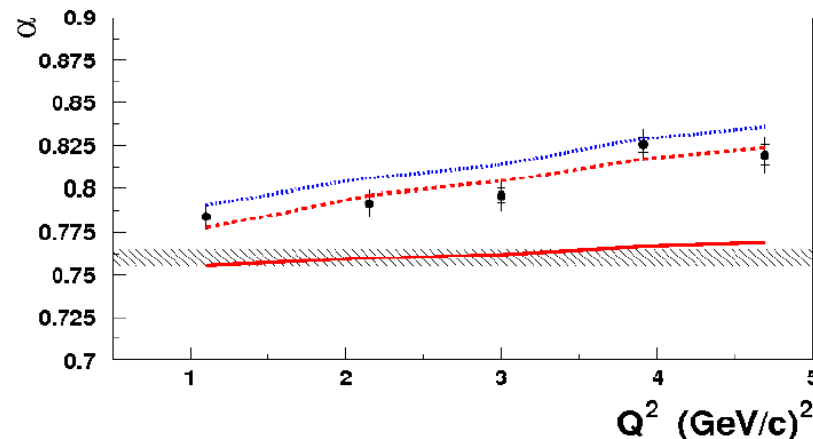


$$T_A = \sigma_A / (A\sigma_N)$$



Seeking Color Transparency - Recent JLab Hall-C Results

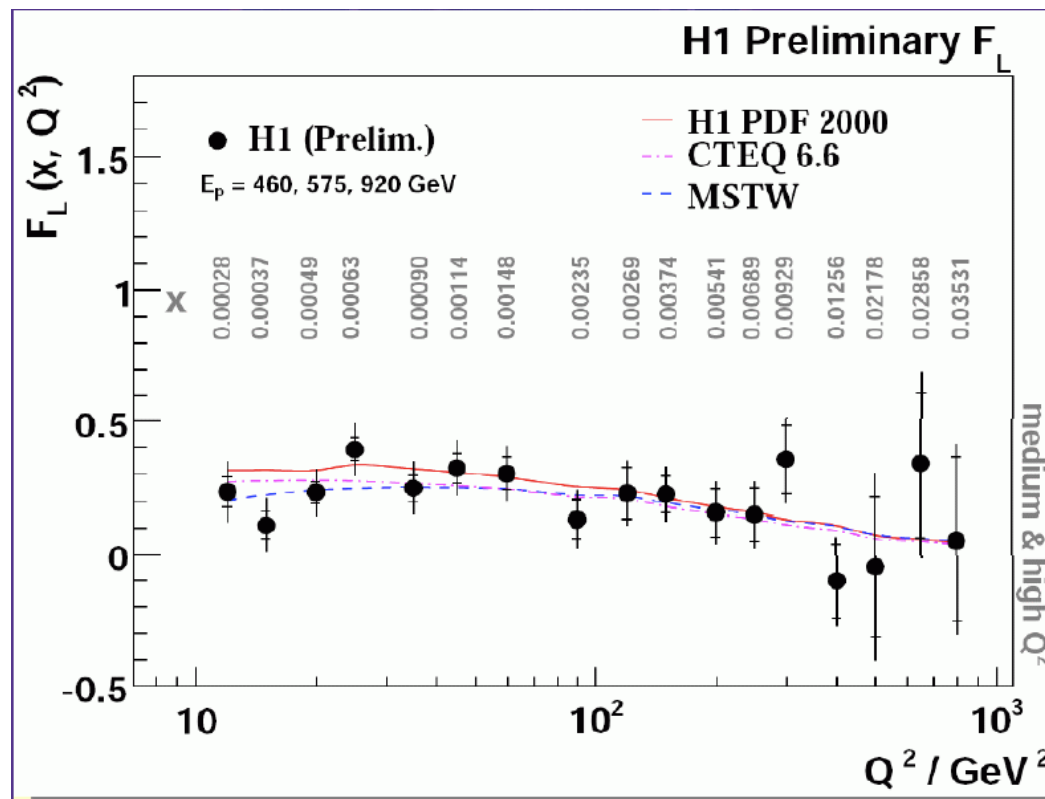
- Measure in Hall C $A(e, e'\pi^+)$ on ^2H , ^{12}C , ^{27}Al , ^{63}Cu , and ^{197}Au for $Q^2 = 1.1 - 4.7 \text{ (GeV/c)}^2$
- Use multi-pion simulation to set missing mass cut and correct for Fermi motion, Pauli blocking, off-shell properties, and acceptance.
- Compared results with Glauber and Glauber+CT.
- Observe modest rise in Q^2 and dependence on A . The parameter α comes from a fit to $T_A = A^{\alpha-1}$ at fixed Q^2 .



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Major News

- Measuring the longitudinal structure function of the proton F_L is a major accomplishment. This structure function reveals the density and distribution of gluons that inhabit the proton.
- The baton passes to the LHC.



Fun Stuff Besides Physics

