A1n/d2n Meeting





Thomas Jefferson National Accelerator Facility





E12-10-002 Precision F₂ structure function at high x

Extend proton and deuteron F_2 structure function precision measurements to larger x and Q². Measuring p(e,e') and d(e,e') cross sections to 3% in the resonance region and beyond up to Q² ~ 17 GeV² and x ~ 0.99

- Constrain Parton Distribution
 Functions at large x
- Distinguish different mechanisms of spin-flavor symmetry breaking (d/u at large x) with precision
 F₂ⁿ/F₂^d (combining with BONUS/Hall B (E12-06-113)
 F2n/F2d)
- Extend studies of local quarkhadron duality in proton and neutron F₂



4

E'



0.5

EMC effect

Detailed study of EMC effect planned in Hall C. (E12-10-008)

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0.1<x<0.9
Up to Q<sup>2</sup> ≈15GeV<sup>2</sup>
Light nuclei: <sup>1</sup>H, <sup>2</sup>H, <sup>3</sup>He, <sup>4</sup>He, <sup>6,7</sup>Li, 9Be,
<sup>10,11</sup>B, <sub>12</sub>C
Medium/Heavy nuclei: Al, <sup>40,48</sup>Ca, Ti,
<sup>54</sup>Fe, Ni, Cu, Ag, Sn, Au, Th
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Early 2018 ran ⁹Be, ^{10,11}B, ¹²C







Color Transparency



d(e,e'p)

Motivation:

- Explore a new kinematical region of the 2-nucleon system above $p_m > 500$
- No Deuteron data exist at these kinematics!
- Short range correlation studies cover similar region on missing momenta
- Models are able to reproduce the present data with 20%.
- Signs of a dependence on NN potential at highest missing momentum
- Measure at well defined kinematic settings, selected to minimize contributions from FSI and delta at Q² = 4.25





E12-09-017 TMD of SIDIS at 12 GeV

Map transverse momentum dependence of (e,e' π) over range:

 $0.2 < x < 0.5, 2 < Q^2 < 5 \text{ GeV}^2, 0.3 < z < 0.5 \text{ and } P_t < 0.5 \text{ GeV}$

Combine with CLAS12 data to constrain transverse widths of u/d quarks and fragmentation functions

Obtain some statistics on transverse momentum dependence of (e,e'K⁺) ~60% of data acquired, remainder in late 2018.



Published Schedule

- August 23, 2018 December 19, 2018
 - E12-09-011 (e,e'K+), E12-09-017 (Transverse TMD), E12-09-002 (CSV)
- January 30, 2019 February 20, 2019
 - E12-16-007 (LHCb Pentaquark)
- February 21, 2019 March 10, 2019
 - Finish E12-09-002 (CSV)
- June 10, 2019 June 17, 2019
 - E12-06-101/E12-07-105 low pass running Pion FF, Pion scaling
- June 18, 2019 June 17, 2019
 - TBD
- October 29, 2019 December 18, 2019
 - E12-06-110 (A1n)
- Intent is schedule d2n to run in 2020. Run plan should prioritize high x A1n. (High impact)







- Schedules are inherently tied to budget scenarios. The actuals for Fall 2018 and 2019 will depend on the budget situation.
 - Example: Fall 2018 startup date was uncertain until recently. Fall 2019 startup uncertain until FY19 budget known.
- Given this, how to plan?...
- JLab used to run ~30 weeks/year. In this time, PAC days could reasonably be translated to calendar days and fully committed.
- Lab and users need to work together to optimize science output (including student theses,...) rather than focus on running approved days.
- The focus may switch somewhat from "what experiment can be scheduled" to "what science can maximally be accomplished in a run period?"
- Other practical issues as ever will still come into play (cross Hall energy compatibility, beam current requirements, ESR cryogenic load, installation time...).



