# Progress Report

## for the $d_2^n$ analysis meeting

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# Skim Update

- Most of 5.9-GeV second-round skim is DONE
- Eventual home: /mss/halla/e06014/analysis/5pass/SkimRound2/
- Some files still on /w/halla/e06014/20110917/SkimROOTfiles/
- New failure modes identified
- **TODO:** Still perfecting script to identify failed skim jobs so they can be redone
- Once script is finished, can double-check results and finish moving files

# Perils of Neutron Extraction in the Resonance Region

- Wally recently worked on an extraction of $F_2^n$ for deuterium data in resonance region
- To get reasonable error bars, you need *very* precise data
- Unfolding process tends to amplify bumps and discontinuities
- Process is easier in DIS region, where structure functions are smooth

# Comparing $A_1^n$ to $A_1^{^3\mathrm{He}}$

- In 2008, Kulagin and Melnitchouk did a systematic comparison of $g_{1,2}^{^3\mathrm{He}}$ to $g_{1,2}^n$
  - Phys. Rev. C **78**, 065203
- Plan for next few weeks: extend this analysis to $A_1$ and $A_2$
- Start from nucleon-level input, apply various approximations (e.g. impulse approximation, effective polarization)
- Should be valid at any $Q^2$ and $W$ (since it doesn't use, e.g., simplified Bjorken limits)

# Toward Neutron Extraction

- Extraction process will be clearer once the nucleon/nuclear comparison is available
- We'll probably want to use an iterative method
  - Kahn, Melnitchouk and Kulagin, Phys. Rev. C **79**, 035205 (2009)
  - Malace, Kahn, Melnitchouk, and Keppel, Phys. Rev. Lett. **104**, 102001 (2010)
- Something analytic is conceivable in a limited kinematic range, depending on the comparison results

# What Wally Needs from Us

- Comparison is simplest at constant $Q^2$
  - *What's a good choice (or two) of $Q^2$ for us?*
- Need some parameterizations of structure functions as input to code
  - e.g. MAID for resonance region
  - PDF-based leading-twist parameterization for DIS
  - *Have we chosen parameterizations for our simulations? We should match inputs.*
- There's an interesting (long-term) side question that he'd be willing to help someone with – can extraction/unsmearing be done for spin-dependent structure functions outside of the effective-polarization approximation?
- Theory group just hired a postdoc to work, in part, on global fits of spin-dependent PDFs. They will want our data eventually!

# What's Next?

- Fix skim-validity check script
- Finish up skim
- Keep in contact with Wally