# Preparations for 12 GeV Software Review
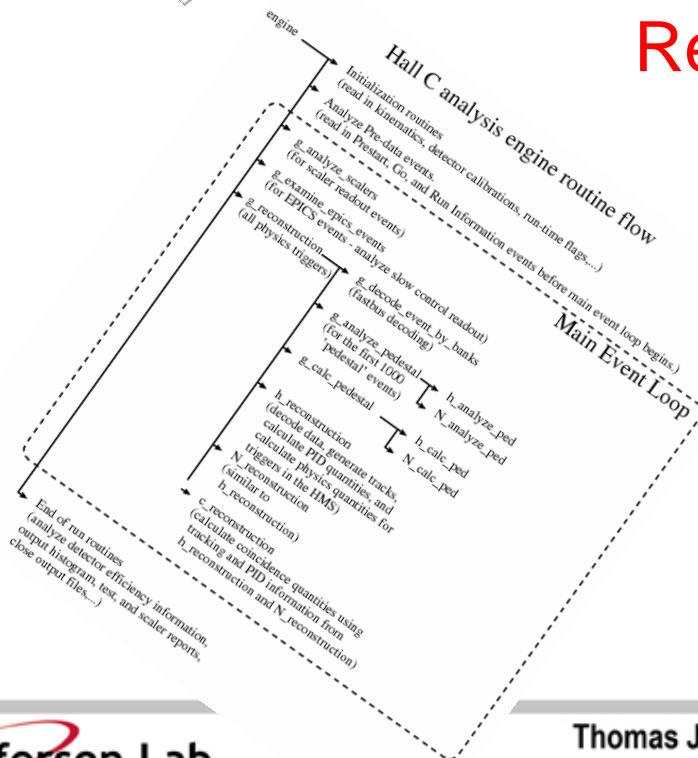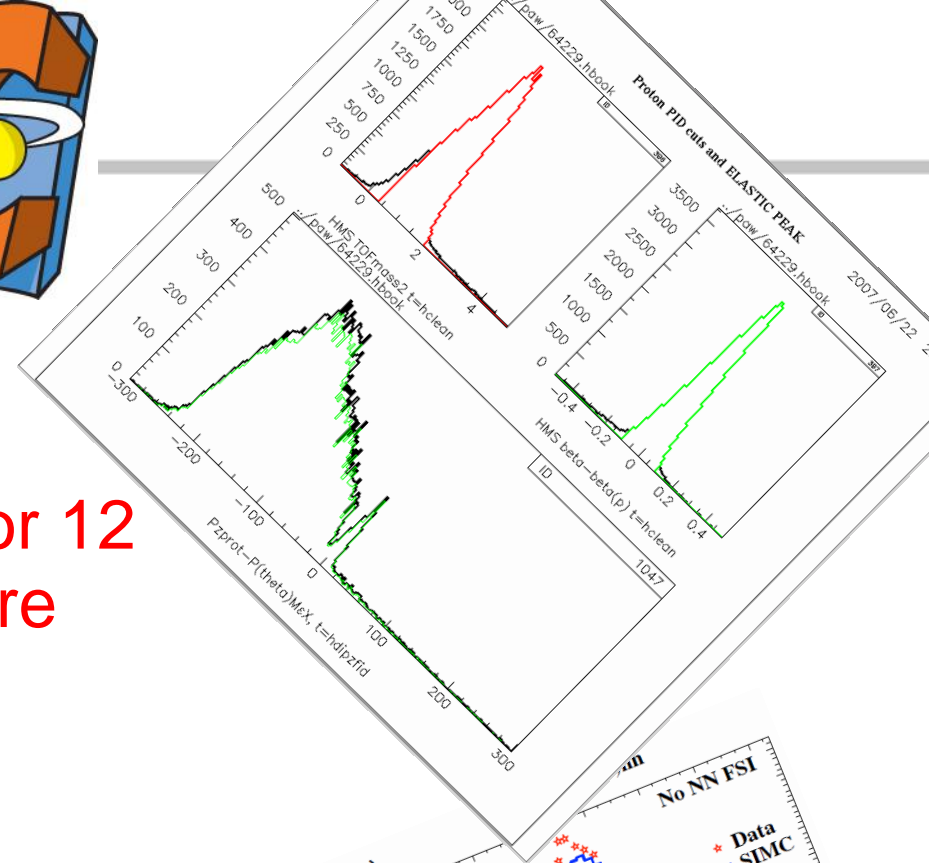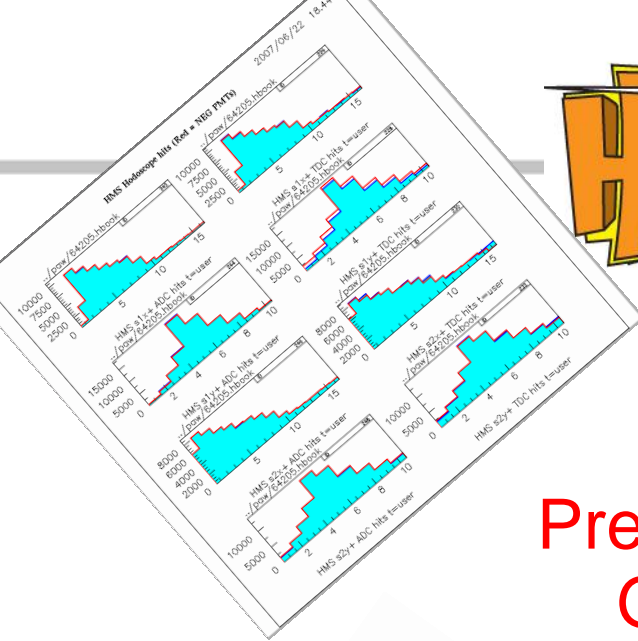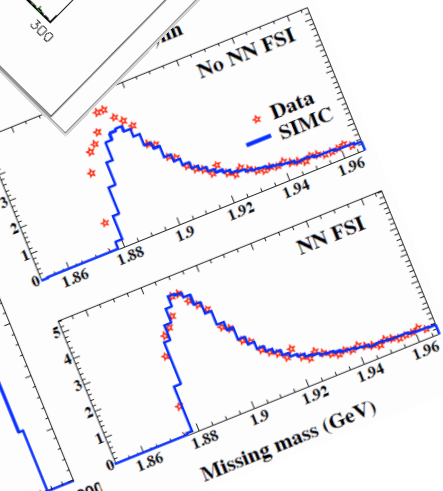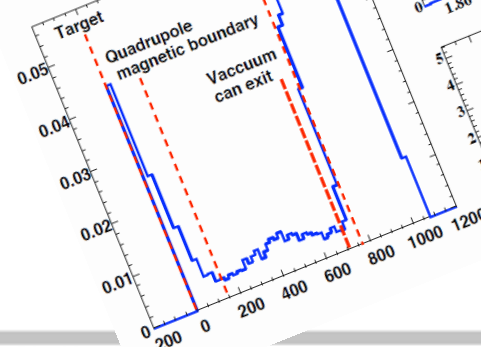
# Detector Software

- Software increasingly becoming part of what is looked at to assess readiness to do science

- Inadequate software readiness impacts ability to commission equipment, online data quality and promptness of publication of results

- JLab  self organizing review(s) of 12 GeV software progress (before someone else imposes reviews on us.)

- Review of 12 GeV software to be held, tentatively early June 2012
    - Purpose: To ensure that detector software will be ready for science.

- Committee will include external reviewers

- Some work by Hall C and users to prepare for this
    Showing our process rather than progress most important for this review

# What to show committee

1.  Requirements:

    Information about detectors, science, observables, triggers, data rates.
    Enough details that detector software experts understand challenges.

2.  Management:

    a.  Management structure – with names
    b.  Work breakdown (major components)
    c.  Manpower and budgets, with MOUs for external labor with well defined tasks and deliverables

3.  Current state of software

    a.  State and progress on major components
    b.  Areas needing additional research, problems, plans to fix

4.  Computing capacity requirements & plans (simulation, analysis)

5.  Milestones:

    a.  Dates when certain capabilities/performance available
    b.  Dates when stress tests, including analysis of simulated events will be available

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# What needs to be done soon

1. Convene software committee – meet on regular schedule
2. Focus on and define management
   a. Define software requirements and scope
   b. Define management structure, assign leadership, obtain commitments, start drafting MOUs
   c. Assign tasks
   d. Define (realistic) milestones
   e. Assign presenters for review
3. Start on software tasks that can show good progress by June.

# Management

1. Many users interested in software development
2. Some sense exists of what each will do
3. Need to document roles of those involved
4. Need to start preparing MOUs, at least for larger commitments
    a. MOUs serve as "proof" of commitments
    b. MOUs can help with grant requests
5. SBS "research management plan" could be a prototype for software management plan.

# Requirements

1. Information about the detectors, the science, the observables, triggers and data rates.
2. Analyze data from existing HMS spectrometer and new SHMS spectrometer
   - Decode raw data into hit coordinates
   - Provide PID information
   - Translate wire chamber data into tracks
   - Match tracks with PID information
   - Produce optics information
   - Traceback to target to determine, scattering angles, particle momenta, position of event on target
   - Produce single arm and coincidence kinematic information.
- Hall C staff member to prepare requirements document and presentation (for item 1)?

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Hall C

# What is our software plan

1.  Develop ROOT/C++ analyzed based on Hall A analzyer for 12 GeV online and off-line analysis

    Why?

    > Good starting point exists
    >
    > Modernity
    >
    > Sharing with Hall A (parameter file formats, tracking algorithms)
    >
    > Minimize cross hall learning curve

2.  Update and document simulation tools (SIMC). (May want/need to explain to review whey full-blown geant4 simulation not needed)

3.  Maintain and upgrade Fortran ENGINE to support at least HMS in 12 GeV era (keep up with detector/front end electronics changes)

    > Primary motivation: Validation tool (compare ROOT/FORTRAN analysis results for 6GeV and 12Gev HMS data.
    >
    > Must be seen as respected/essential part of overall plan

# Thoughts on Plan

- Develop C++/Root analyzer based on Hall A package
    - Add code to read Hall C style device maps and parameter files (or develop scripts to convert to Hall A style)
    - Flexible decoder that will read legacy HMS data
    - Determine if any parts of CTP (beyond parameter file reading) are needed/desirable
- Hall A/C cooperative projects
    - General analyzer infrastructure improvements

        (Upgrade parameter/map files to a common format)
    - Cooperation on tracking algorithms

# Near term software developement

- JMU proposes to do the following by summer
    - Write parser classes to read Hall C style parameter files into Hall A analyzer framework
    - Define an HMS spectrometer that can read parameters
    - Write hodoscope analysis software, trying to match Fortran analyzer output

- This would be nice progress to report at a review

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# Short Term Milestones

- 2/2012    Define major requirements, scope and milestones
           Regular meeting schedule in place
- 3/2012    Define management structure and key players
           Assign major tasks
           Verbal agreements to make MOUs
           Refine scope and milestones
- 4/2012    Decide on role of Fortran analyzer
           Outline of review presentations
- 5/2012    Demonstration of some coding progress
           Circulating draft of at least one MOU
           Prepare for review
- 6/2012    Review

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# Installation Milestones

- 9/2013          Shower counter installed

- 4/2014          All detectors installed

- 9/2014          First Commissioning beam

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# Milestone Thoughts

- 7/2012      Code management system (CVS/SVN) deployed
- 9/2012      Preliminary definition of DAQ hardware/Data format
- 10/2012      Decoding of legacy hardware (Fastbus) done
- 12/2012      ROOT analysis of HMS hodoscopes verified
- 1/2013      Complete definition of software funtionality
- 4/2013      Decoding of new DAQ hardware ready
- 7/2013      Full analysis of legacy HMS
- 9/2013      SHMS Code ready for shower counter tests
- 12/2013      Full ROOT analysis of legacy HMS data verified
- 4/2014      Code ready for cosmic tests of individual detectors
- 7/2014      Demonstrate full focal plane analysis with cosmics (SHMS+HMS)
- 9/2014      Coincidence analysis, First beam
- 12/2014      Data driven bug fixing/code improvements

First Commissioning beam

# Conclusions

- Hall C software task not difficult compare to Halls B, D
- But:
    - Much to be done, with framework new to many
    - Need more formal organization
    - Need to start measuring our progress
    - First SHMS detectors installation < 2 years
    - First beam < 3 years
- Documentation important, needs to be in milestones
- Need coordinated DAQ/Electronics milestones
- Need initial meeting (with physical presence of major participants) within next month.

- Contact me with meeting data preferences.