CLAS12 software session

June 18, 2018



Outline

- Session agenda
- Progress since last meeting
- Documentation & forum
- HIPO4 transition and tools
- Use of offsite resources
- Near term plan
- Software workshop



Session agenda

14:00 - 18:20	CLAS C	Collaboration Meeting - CLAS12 Software
	Convene	r: Raffaella De Vita (INFN - Genova)
	Location:	F113
	14:00	Introduction and news 25' Speaker: Raffaella De Vita (INFN - Genova)
	14:25	Reconstruction status and recent updates 25' Speaker: Veronique Ziegler (Jefferson Lab)
	14:50	RICH reconstruction 20' Speaker: Mr. Marco Contalbrigo (INFN Ferrara)
	15:10	Event builder updates 20' Speaker: Nathan Baltzell (Jefferson Lab)
	15:30	Coffee break 30'
	16:00	News from Scientific Computing 30' Speaker: Bryan Hess (Jefferson Lab)
	16:30	CLAS12 simulations: update on software and computing resources 25' Speaker: Dr. Maurizio Ungaro (Jefferson Lab)
	16:55	HIPO4 data format: performances and functionalities 20' Speaker: Gagik Gavalian (Jefferson Lab)
	17:15	Data processing tools <i>20</i> ′ Speaker: Nathan Baltzell (Jefferson Lab)

+Workshop on Friday!



Progress since last meeting

Focused on preparation for pass1 cooking and user support

Data format:

- complete transition to Hipo4
- first production release based on Hipo4

Geometry:

- Use target offset to shift CD detectors
- Implement alignment tables for FC detectors

Simulations:

- Infrastructure to submit simulations to MIT farm
- GEMC configuration in EVIO file with Json format
- RG dependent geometries

Environment:

- Common install area under /group/clas12
- New shared CLARA installation
- Environment setup tools

Data processing tools:

Extend workflow functionalities

Analysis:

- CLAS12Tool updated for hipo4 and extended
- Java tools for HIPO file browsing and plotting
- Helicity analysis

Reconstruction updates:

- DC Tracking:
 - Beam x/y offsets validation
 - Update of trajectory bank
 - Validation of dc wire distortion
 - DC calibration anomalies
 - Fitting and swimming improvements (swim-to-beamline)
 - Tracking efficiency improvements (ongoing, will continue after pass1 release)
- CVT:
 - Efficiency studies and improvements
 - Use of alignment in tracking
- ECAL:
 - Logarithmic weighting in cluster position
 - Validation of moments calculation
 - Edge distance calculation for fiducial cuts
- TOF:
 - Position dependent TW for FTOF
 - Position dependent time correction for CTOF
 - FTOF ADC-TDC matching
- FT:
 - FTT reconstruction
 - FTC TW correction
- HTCC:
 - Hit bank with pointers between clusters and ADCs
- BAND:
 - First reconstruction version
- RICH:
 - New reconstruction service
- EB:
 - Trajectory bank information used for hit-matching
 - track hit matching to allow many-to-one relations
 - REC::Scintillator banks
 - FT-based start time
 - Vertex correction to start time



CLAS Collaboration Meeting, 6/18/2019

2

See Veronique's and Nathan's talks

Documentation

- New centralized software wiki:
 - Single "portal" for all relevant information and specific web or wiki pages
 - Intended for "official"
 CLAS12 software
 - Work on updating and completing underlying documentation will continue
- Recent additions/updates:
 - DST documentation updated for HIPO4 and extended to new helicity banks
 - Link to Java docs
 - Updated HIPO java/groovy examples and Jupyter notebooks



https://clasweb.jlab.org/wiki/index.php/CLAS 12_Software_Center



Discourse forum

New forum for software related questions and communications:

- Used successfully in 2018
- Now being restored
- New topics organization and updated information based on recent developments
- To be released soon



HIPO4

- Transition to HIPO4 completed:
 - New HIPO4 based coatjava distributions (6x.Y.Z)
 - CLARA 4.3.10
 - Grapes 2.1 (trains)
 - Calibration suites ready to use after recompilation including updated coatjava libraries
 - CED
 - C++ library
 - CLAS12Tool for ROOT based analysis
- Changes (almost completely*) transparent to user: just need Hipo4 coatjava libraries
- New functionalities (event tagging) used in decoding
- Currently used by RG-A, B, and K
- Jupyter examples how to read HIPO4 files, how to skim, and read/write tagged events for fast reading.

* With the exception of changes to banks/variables





JAW

- Java based tool for quick interactive browsing/ plotting of HIPO files:
 - Useful for software developers, calibrators and detector experts for quick checks on HIPO bank contents
 - Browsing of banks/variables
 - 1D and 2D plotting with selection cuts





Use of offsite resources

Additional computing power to support CLAS12 data analysis by exploiting offsite resources:

- Simulations:
 - Open Science Grid (OSG)
 - -MIT computing farm
 - -Support to GW users in utilizing local computing cluster
 - -WLCG clusters (UK, INFN)
- Reconstruction:
 - Tests at National Energy Research Scientific Computing Center (NERSC) started
- Software distribution:
 - Docker container transformed into singularity image
 - -Share via CernVM File System (CVMFS)

See Maurizio's talk



Near term plan

- Reconstruction (complete preparation for pass1):
 - Import tracking efficiency improvements
 - -Implement RF vertex correction in PID
 - -Use trajectory information for hit-track matching
 - Import new FTT and RICH reconstruction
- Simulation:
 - -Release new version with RG-dependent geometry support
 - -Validation of background merging
- Data processing:
 - Continue support to Run Groups
 - -Extend data processing tools



Software workshop

- Running simulations with docker interactively or submitting to offsite resources (Bobby)
- Reading hipo4 files: examples in Jupyter notebooks (Gagik)
- How to use the new environment setup (Nathan)

