



# Software Update

Maurik Holtrop, HPS Collaboration Meeting

---

May 22, 2018



# Software Presentations This Meeting

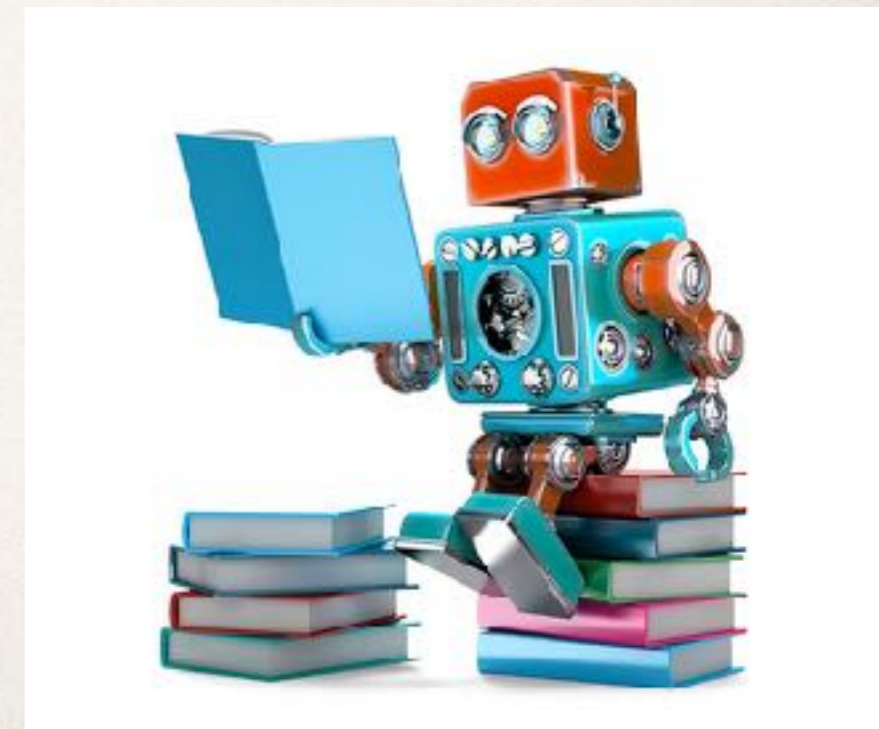
---

## ❖ Software session:

- ❖ Machine learning, tridents with MC truth - Kyle McCarty
- ❖ Update on MC - Takashi Maruyama
- ❖ Beam Position and Tilt - Bradley Yale

## ❖ Tracking session:

- ❖ Tracking update - Norman Graf
- ❖ SVT alignment, 2016 - Alessandra Filippi
- ❖ Track top-bottom asymmetry - Miriam Diamond
- ❖ Update on Kalman filter (rem.) - Robert Johnson



# Bug hunting & Open issues.

---

- ❖ Lots of bugs hunted, rabbit holes descended, and some things fixed:
  - ❖ Trying to speed up Tracking
    - ❖ Miriam found many bugs: Sectoring issue in tracking, Track state at ECal incorrect, Extrapolate to tilted plane with field map, ...
  - ❖ Cleanup of Tuple Maker
    - ❖ Remove the parts of the code that did calculations. Tuple Maker should only convert the LCIO files to ROOT Tuples.
    - ❖ Bugs were fixed in this process.
    - ❖ **To Do:** Make tuples from the ROOT DST instead of a text file dump from LCIO files.
  - ❖ Reconstruction getting stuck
    - ❖ Reconstruction would crash or get stuck. Several bugs were found: Matrix Singularity, Large dPhi Exception, Tracks going backwards.
  - ❖ We need to continue vigilance in validating our code and finding bugs.
- ❖ Open issues on GitHub:
  - ❖ Most open issues now are enhancements.
  - ❖ New potential bug: truth information from SLIC incorrect (?)



# Code Enhancements

---

- ❖ Enhancements:

- ❖ MC Truth

- ❖ New readout code for ECAL - Kyle

- ❖ Detailed MC truth for SVT - Matt Solt

- ❖ Were needed for propagating truth information to output, which in turn is needed for Machine Learning.

- ❖ Merging Pulser data with MC - Kyle

- ❖ This is a lot trickier than first suggested method. Issue still not resolved.

- ❖ Needs to be finished.

- ❖

# New Initiatives

---

- ❖ hps-sim - Jeremy

- ❖ An improvement on slic, but we need to validate it to move this into production.
- ❖ Could help with Slic related issues, i.e. MC particle truth.
- ❖ Cleaner code and interface. Can do event filtering.

- ❖ Kalman Filter (See Robert Johnson's talk)

- ❖ Add L0 layer to simulation and readout/reconstruction. - Matt Solt

- ❖ Add Hodoscope to sim, and readout/reconstruction. -Rafo/Kyle



# GitHub / SLACK

This repository Search Pull requests Issues Marketplace Explore

JeffersonLab / hps-java Unwatch 18 Star 2 Fork 3

Code Issues 33 Pull requests Projects Wiki Insights Settings

Filters is:issue is:open Labels Milestones New Issue

33 Open 144 Closed Author Labels Projects Milestones Assignee Sort

- Calculate and Save Fitted V0 Momentum Covariance Matrix #311 opened 26 days ago by bloodyyuge
- Tracking Performance Plots enhancement #309 opened on Mar 22 by normangraf
- Add beam profile to conditions database enhancement #306 opened on Mar 19 by byale-jab
- Add SVT Hit Level Drivers #301 opened on Mar 5 by mrsolt
- Add Full Truth info to tuple maker enhancement #297 opened on Feb 8 by mrsolt
- SVT Hit Efficiency Code task #290 opened on Feb 1 by mrsolt
- Create FEE filter for MC enhancement #288 opened on Jan 30 by byale-jab
- Generate 3D representations for detector and data elements enhancement #275 opened on Dec 13, 2017 by normangraf
- Update Hit Removal Driver enhancement #274 opened on Dec 12, 2017 by mrsolt
- Add Track Extrapolation Error Method enhancement #273 opened on Dec 11, 2017 by mrsolt
- Reconstruction hangs on certain events bug help wanted #267 opened on Dec 6, 2017 by mholtrop
- Create unit test(s) for TupleDriver task #260 opened on Nov 21, 2017 by mdlamon
- Update Edge Corrections for 2016 Data enhancement #249 opened on Nov 20, 2017 by sebouh137
- Add SVT hit efficiencies to the MC enhancement #228 opened on Oct 30, 2017 by mrsolt
- Allow pulser data to be mixed with MC signal enhancement #225 opened on Oct 26, 2017 by mholtrop

HP Heavy Photon 5... maurik

Jump to...

All Unreads All Threads

Channels

- # general
- # github
- # project-2015pass7-8
- # project-2016pass2
- # project-hps-sim
- # simulation
- # software
- # tracking
- # vertexanalysis

Direct Messages

- slackbot
- jeremym
- jeremym, mccaky
- mccaky, rafopar, byale
- rafopar

Apps

+ Add Apps

#software 21 | 1 | Add a search

Monday, May 14th

```
<readout none= no  
  <segmentation type="GridXYZ" gridSizeX="1.0*mm"  
    gridSizeY="0.8" @idSizeZ="0.8" />  
  <id>system:6,layer:2,x:-8,y:-6</id>  
</readout>
```

I only updated the v3 compact and LCDD files. If you want to use the other ones you need to update the compact XML yourself and regenerate the LCDD files.

rafopar 3:21 PM  
I did "mvn clean install -DskipTests" on branch iss166, does it mean JAS3 uses the iss166?

I think this should not be the case, since Kyle claims he is able to run this, and I think he pushed his changed compact.xml into git.

Ok thanks. anyway let me check how my compact.xml looks like

rafopar 3:44 PM  
Detector lodd is the same as the one that I just have generated through org.hps.detector.DetectorConverter

So, I think it is the most up to date detector (edited)

jeremym 5:21 PM  
@rafopar can you confirm with Kyle that he has files in JAS3? I actually only checked command line programs

rafopar 5:40 PM  
he told me that he can, but just in case I sent an e-mail to Kyle and asked to confirm this one more time.

mccaky 6:01 PM  
I am able to open the file without any issue on my local machine using JAS3.

I also uploaded it to my homepage on the JLab servers, if you want to check that it's the right file.

The git repository for iss166 is up-to-date with my local copy, except for some unrelated analysis drivers, so there shouldn't be anything I have locally that would cause it to work for me, but not others.

+ Message #software

Email list still works too!

# To-Do

---

- ❖ **Fix bugs!**

- ❖ Continue to follow each unexpected / odd behavior to the end.

- ❖ **Document!**

- ❖ Continue to improve documentation.
  - ❖ Really important for new people joining.

- ❖ **Finish up:**

- ❖ Complete code for merging Pulser data with MC.



# To-Do, too, for 4.5 GeV Run.

---

- ❖ Hodoscope:
  - ❖ Hodoscope included in trigger and trigger monitor, fully add to readout and recon.
- ❖ SVT:
  - ❖ Updates for L0 in readout/recon
- ❖ **Start generating and analyzing MC @ 4.5 GeV**
  - ❖ New detector model with hodoscope and L0. (Improve the detector model?)
  - ❖ Re-run trigger optimizations.
- ❖ Monitoring code:
  - ❖ Validate SVT, ECAL, Trigger
  - ❖ Add Hodoscope
- ❖ “Prime” the calibration database for 4.5GeV data.
- ❖ Check calibration codes for use in new run.
- ❖ Revisit DQM



# Transitioning again...

---

- ❖ Moving from “just get it to work” to get everything working really well.
  - ❖ Continue ironing out the bugs / anomalies.
  - ❖ Document what we do, document procedures.
  - ❖ Do the enhancements that are really needed.
  - ❖ Work on making things (more) robust.
  - ❖ Start smoothing, simplifying, think of ease of use. Helps eliminate human error / confusion.
- ❖ We need to be able to calibrate quickly, “cook” quickly, and get to data analysis quickly.
- ❖ New people need to get to being productive quickly.
- ❖ There is a lot to do here!

# People Power Needed

- **Big issue ~~ahead~~: <sup>arrived</sup> Continuity**
- Our current group of graduate student experts has graduated, is about to graduate, or is working to graduate soon. (Sho, Omar, Holly, Sebouh, Ani, Miram, Kyle, Bradley).
- Postdocs, staff, are in similar situations, moving on or looking to move on. (Miriam, Jeremy)
- The “2019 run” will be more demanding!
- New students, postdocs, staff, are needed to take over critical tasks and maintenance of software components...

2018/05/22  
~~2017/10/26~~  
~~2017/05/04~~



