BAND: Commissioning and calibration plans

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BAND & Upcoming Schedule

RG-A: 8/22 - 11/25

- 11 GeV e^- beam
- Liquid H_2 target

RG-K: 11/29 - 12/19

- 7.5 & 6.5 GeV e^- beam
- Liquid H_2 target

BAND Reinstallation: 12/20 - 1/22

RG-B: 1/30 - 3/10 & 11/1 - 12/19

- 10.6 GeV e^- beam
- Liquid D_2 target

Overview of Current BAND Status

- < 50% channels active
- In next days, readout with CLAS in production mode (already done with cosmics in CLAS)
- **Cosmic triggering to perform calibrations**
- **Understand background rates from beam**

What we'd like to accomplish during RG-A

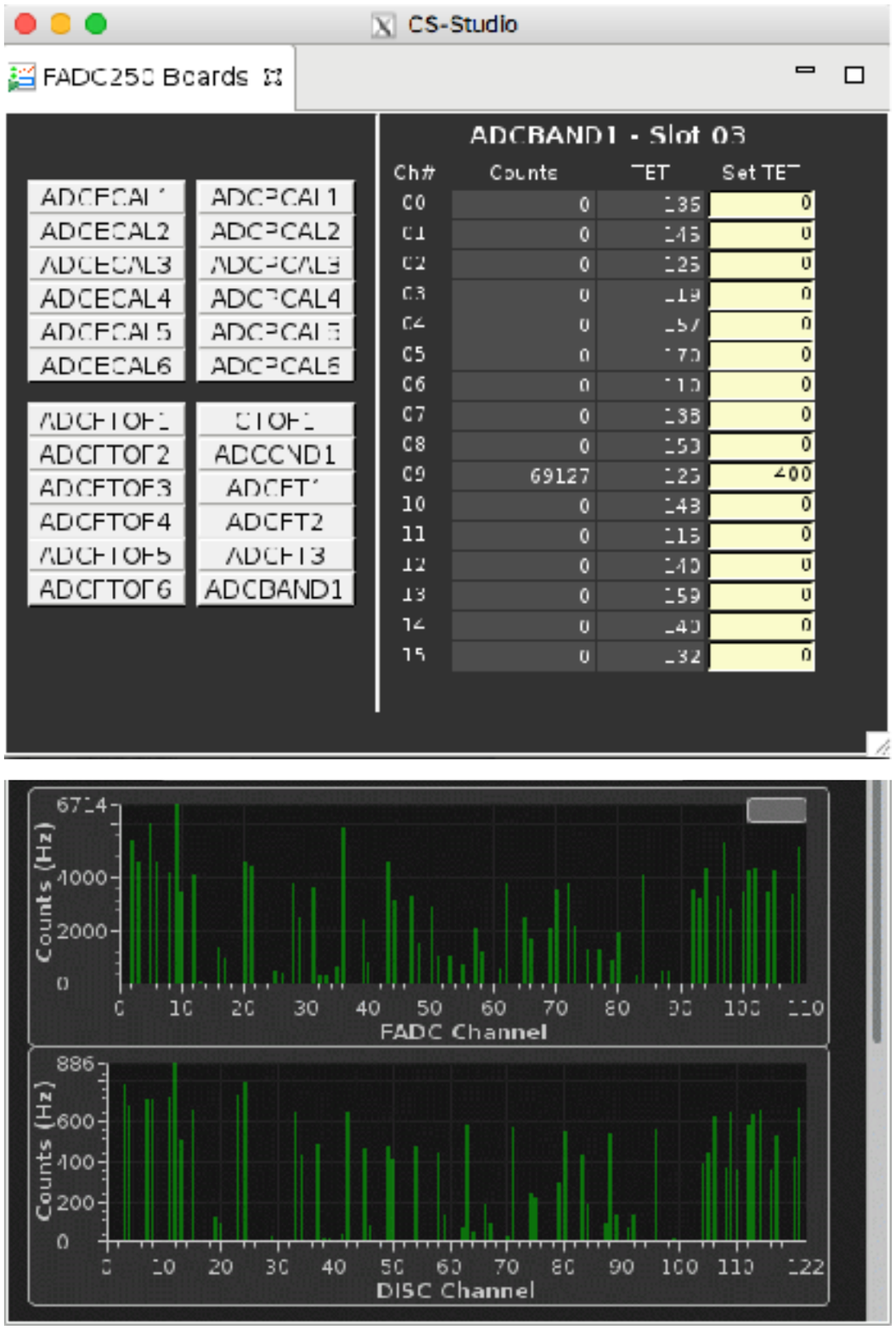
1. Develop calibration & reconstruction software

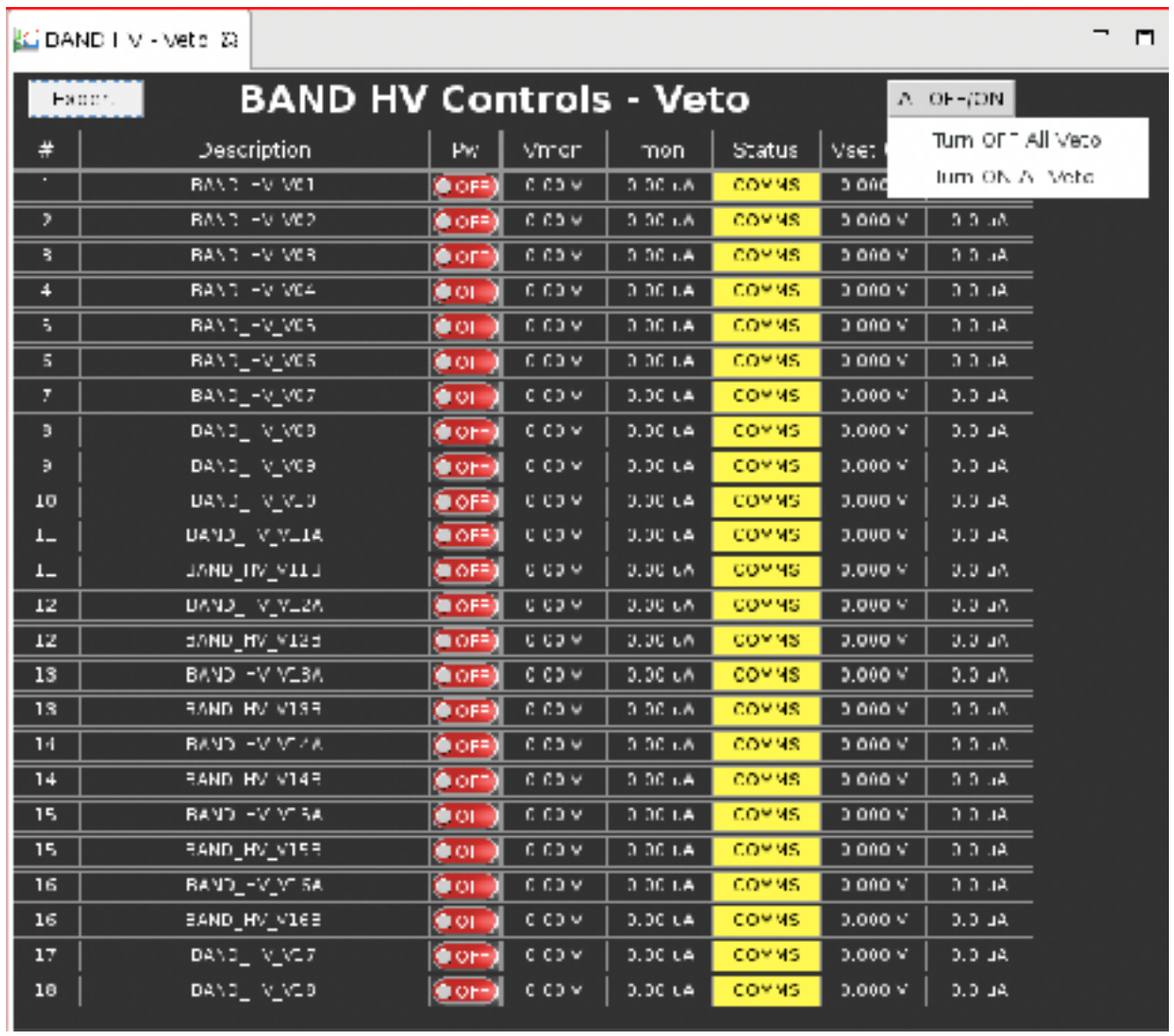
2. Perform calibrations with cosmics

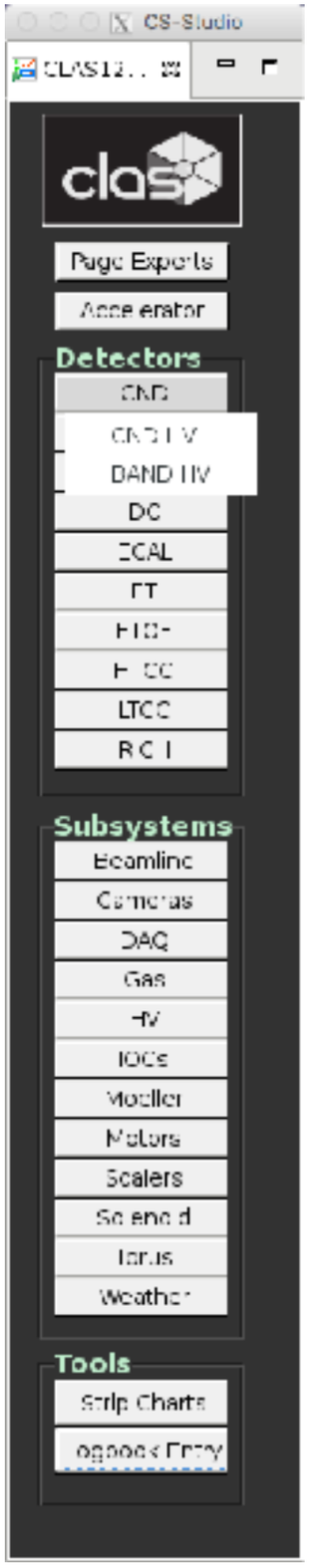
3. Continue developing laser system (see Jackson's talk)

BAND Slow Control

Developed by Nathan B.



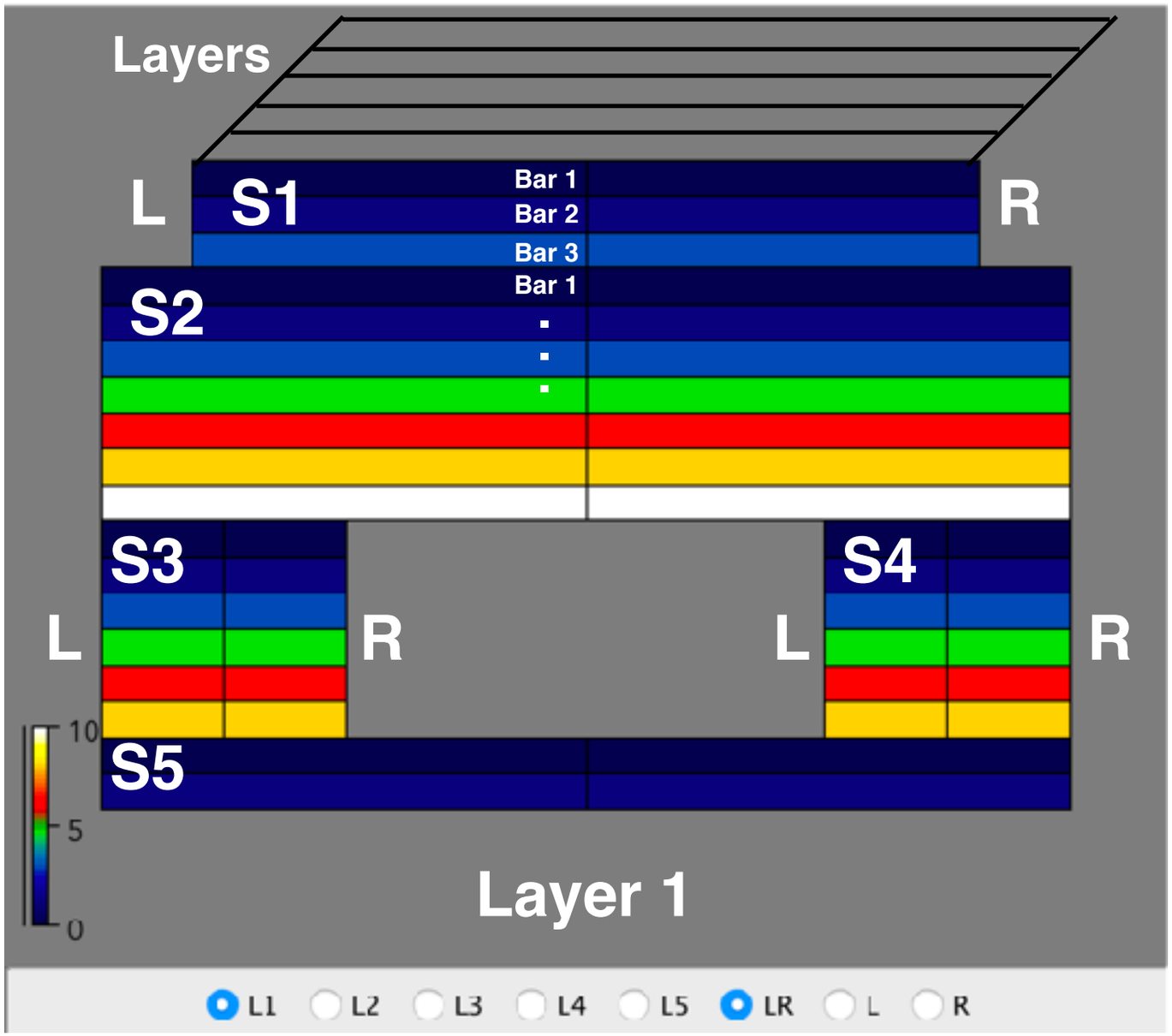




BAND in CLAS12 Software

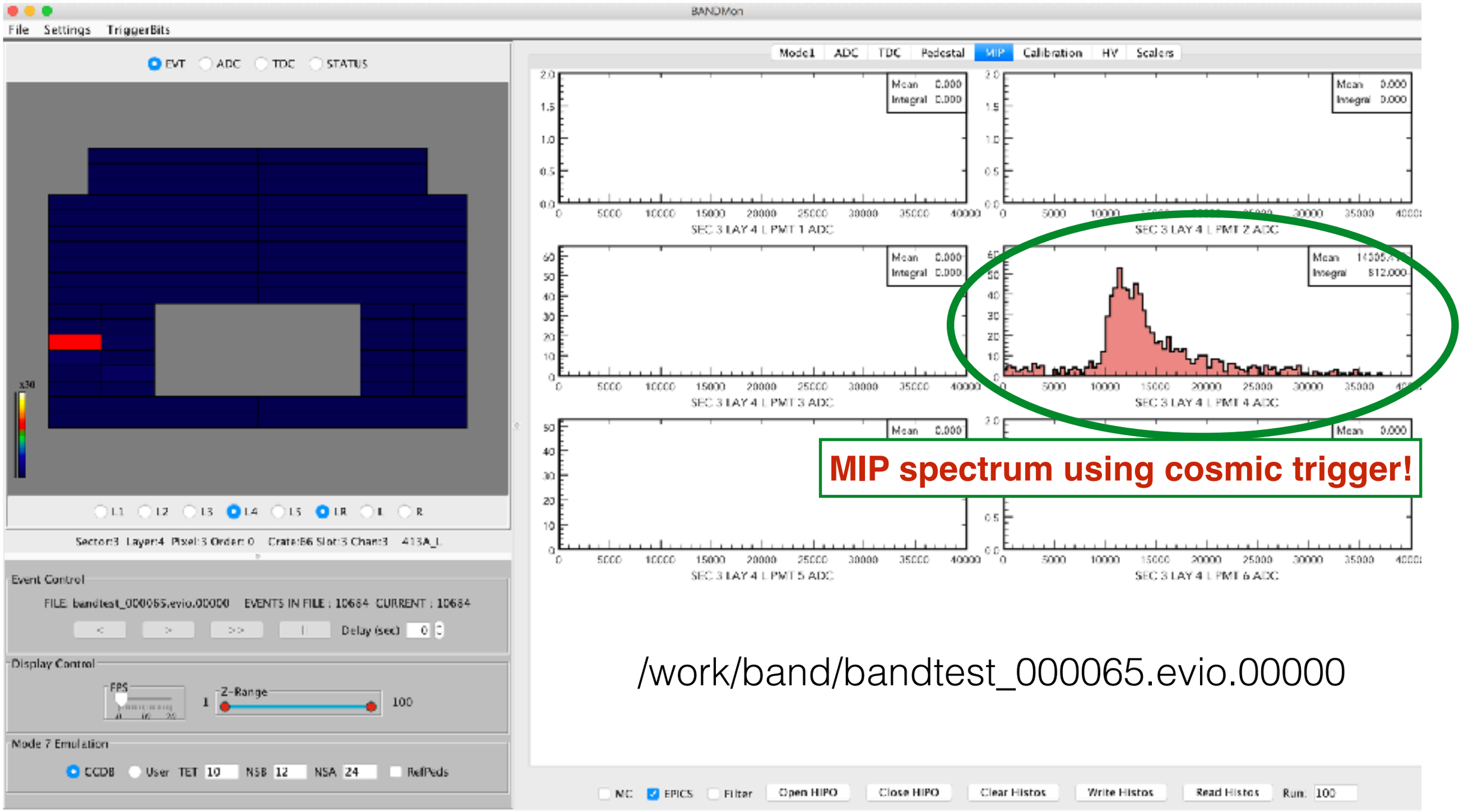
- BAND unique detector ID = 21

- Divided into <u>five</u> sectors, <u>five</u> layers (columns), elements (bar / paddle) and left/right



Online Monitor Suite

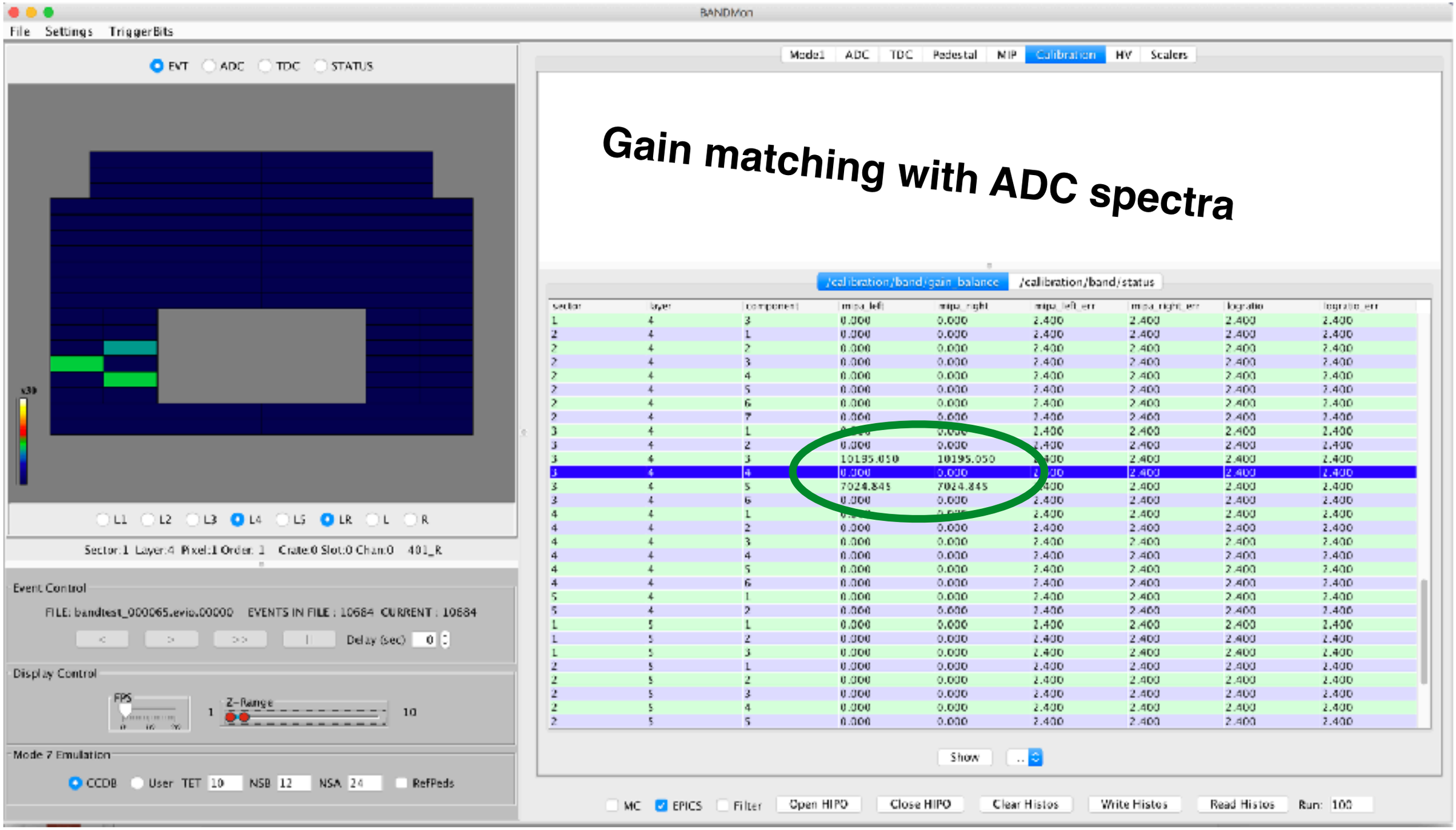
Online monitoring software & structure developed by Cole Smith



/work/band/bandtest_000065.evio.00000

Calibration Software Suite

I’m currently developing BAND calibration suites using cosmic data



Other software requirements

Reconstruction algorithm (not started)

Geometry description for CLAS12 software (~50% done)

Integration to GEMC (not started)

- Classes to store simulated hits to banks started

Calibrations we are aiming to finish during RG-A

- Cosmic gain-match
- Left-right time shifts
- Speed-of-light map
- Attenuation lengths
- Time-walk correction / resolution

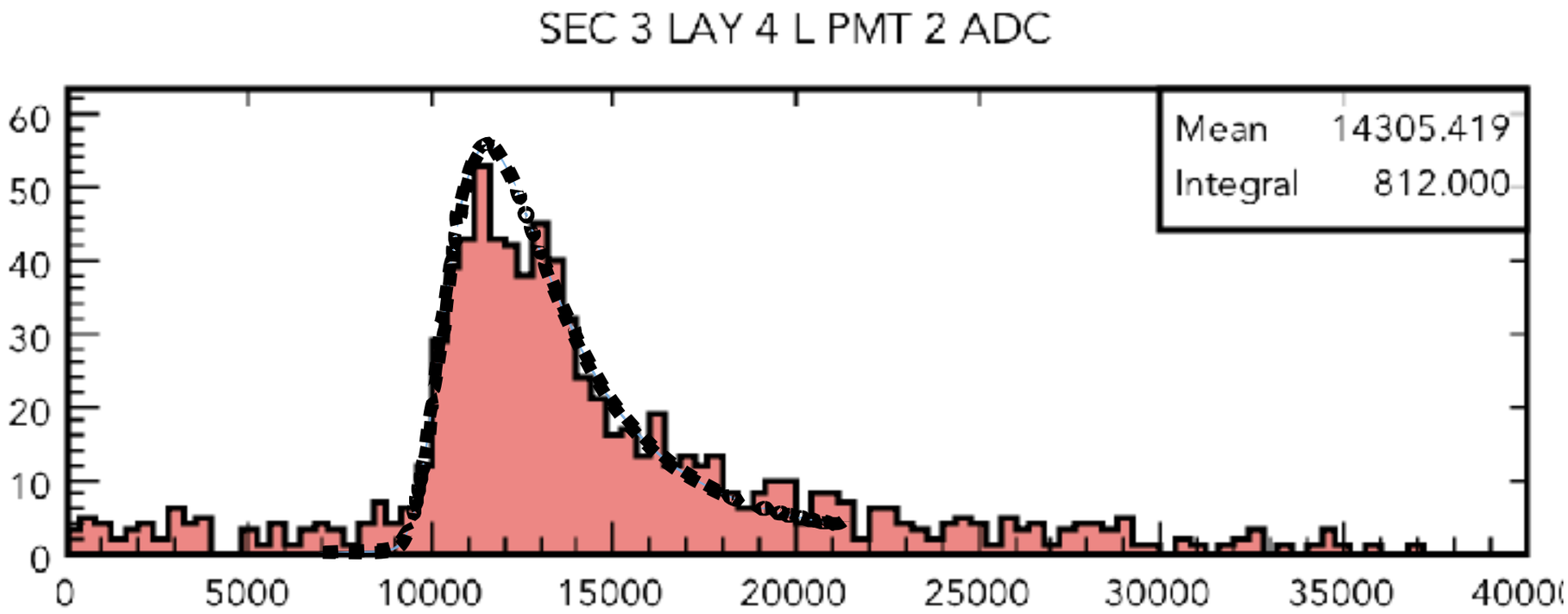
- Threshold determinations
- Neutron efficiency
- Time-of-flight (global time) calibration
- Re-scattering
- Background measurement

} Need LD_2 for (e,e'pn) exclusive

Cosmic gain matching

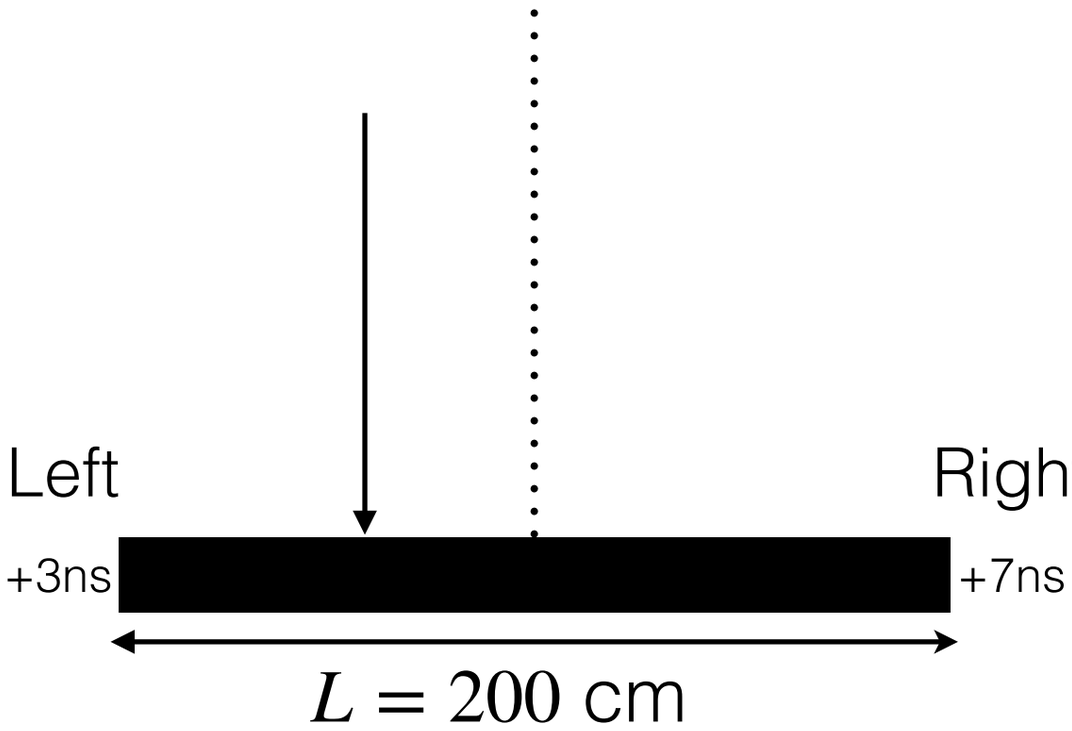
Best we can do until laser system & neutrons from d(e,e'pn)

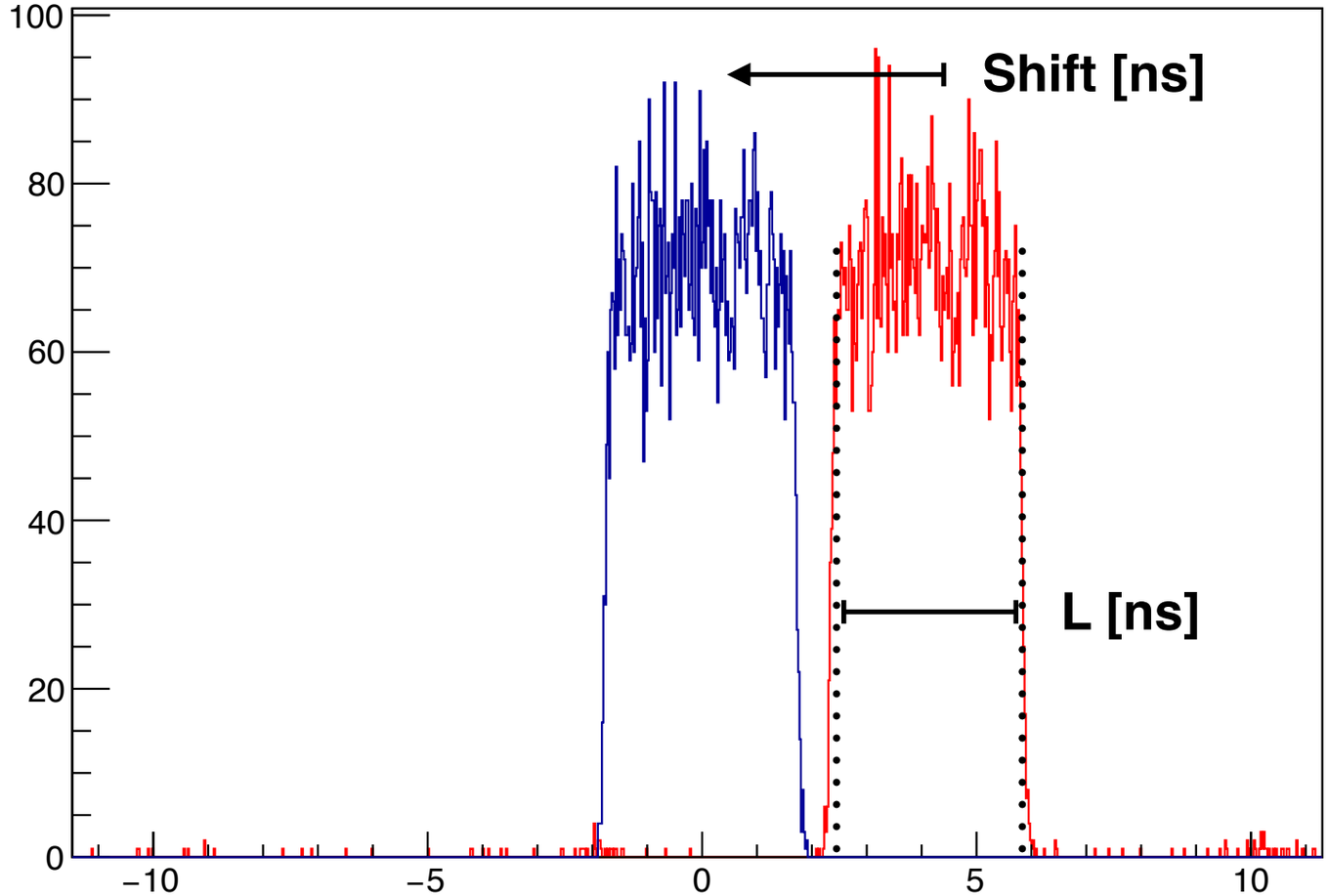
However, not the relevant energy range we want



(~14MeV)

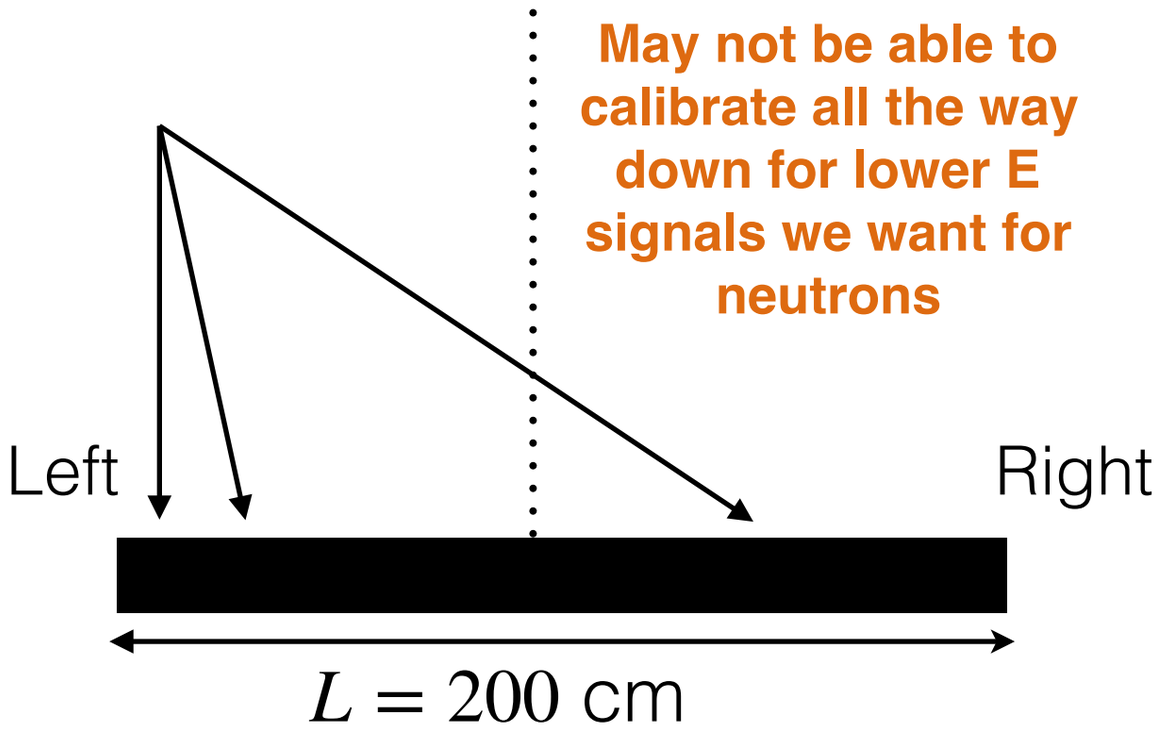
Left-right time shift & speed-of-light

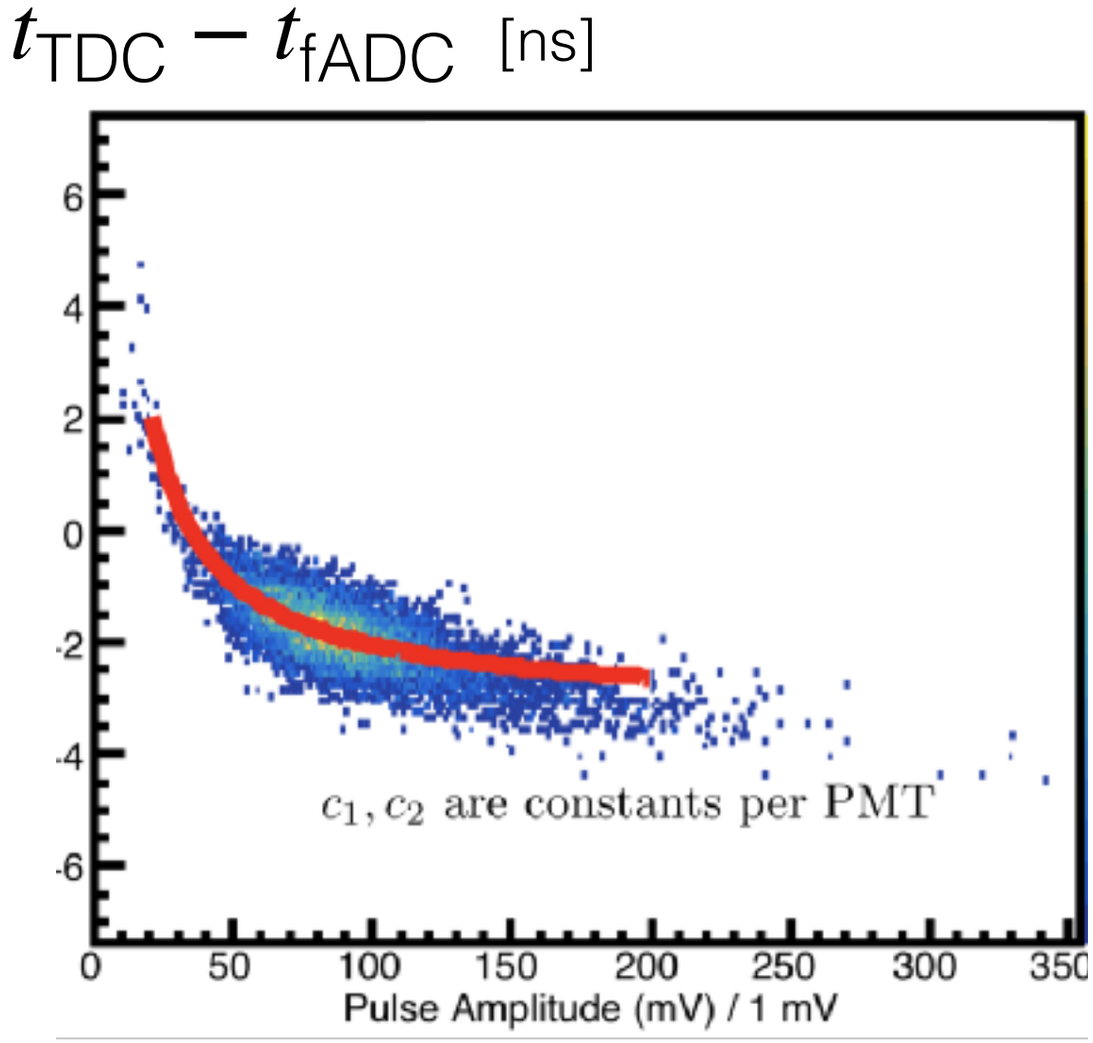




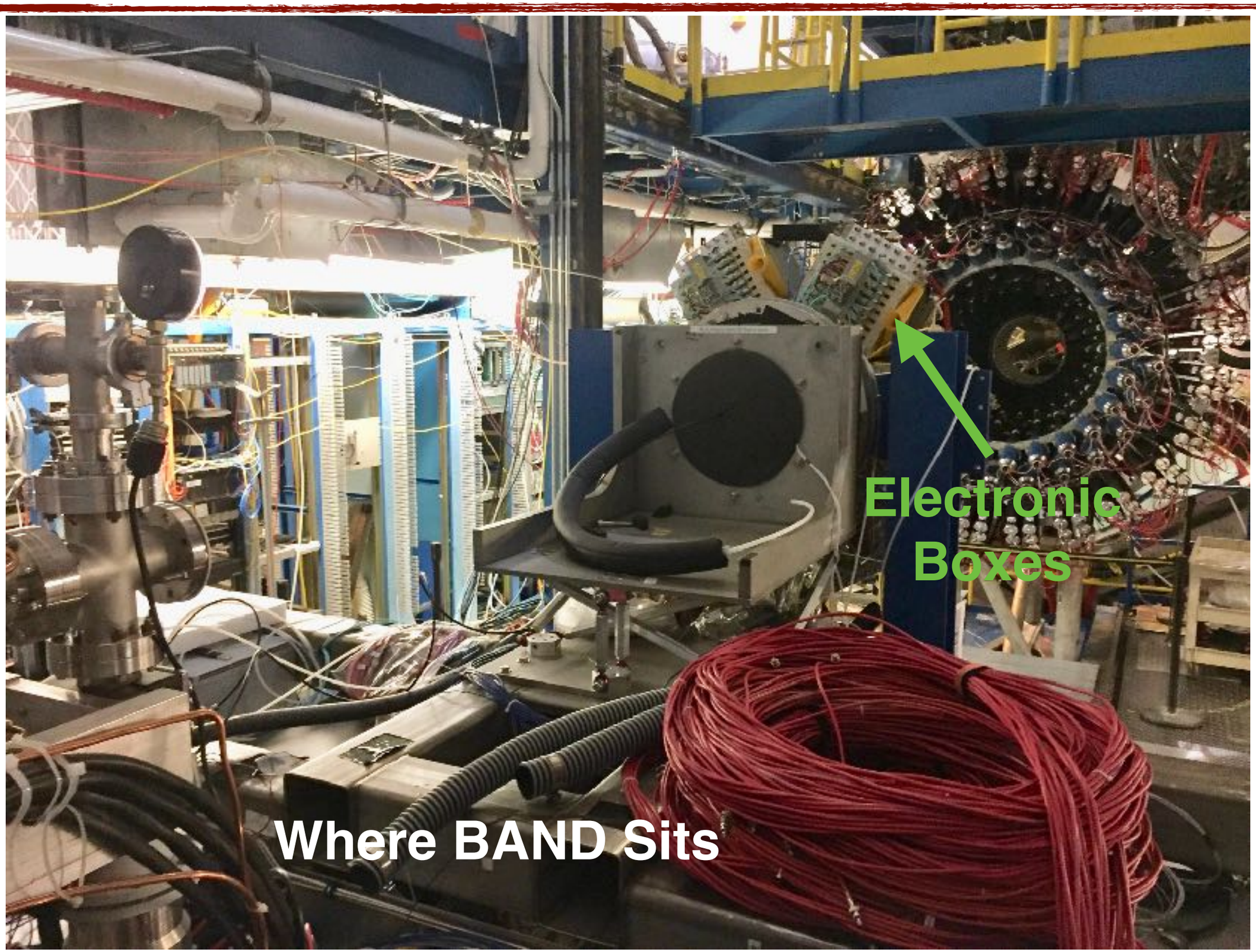
Time-walk correction & resolution

May not be able to calibrate all the way down for lower E signals we want for neutrons



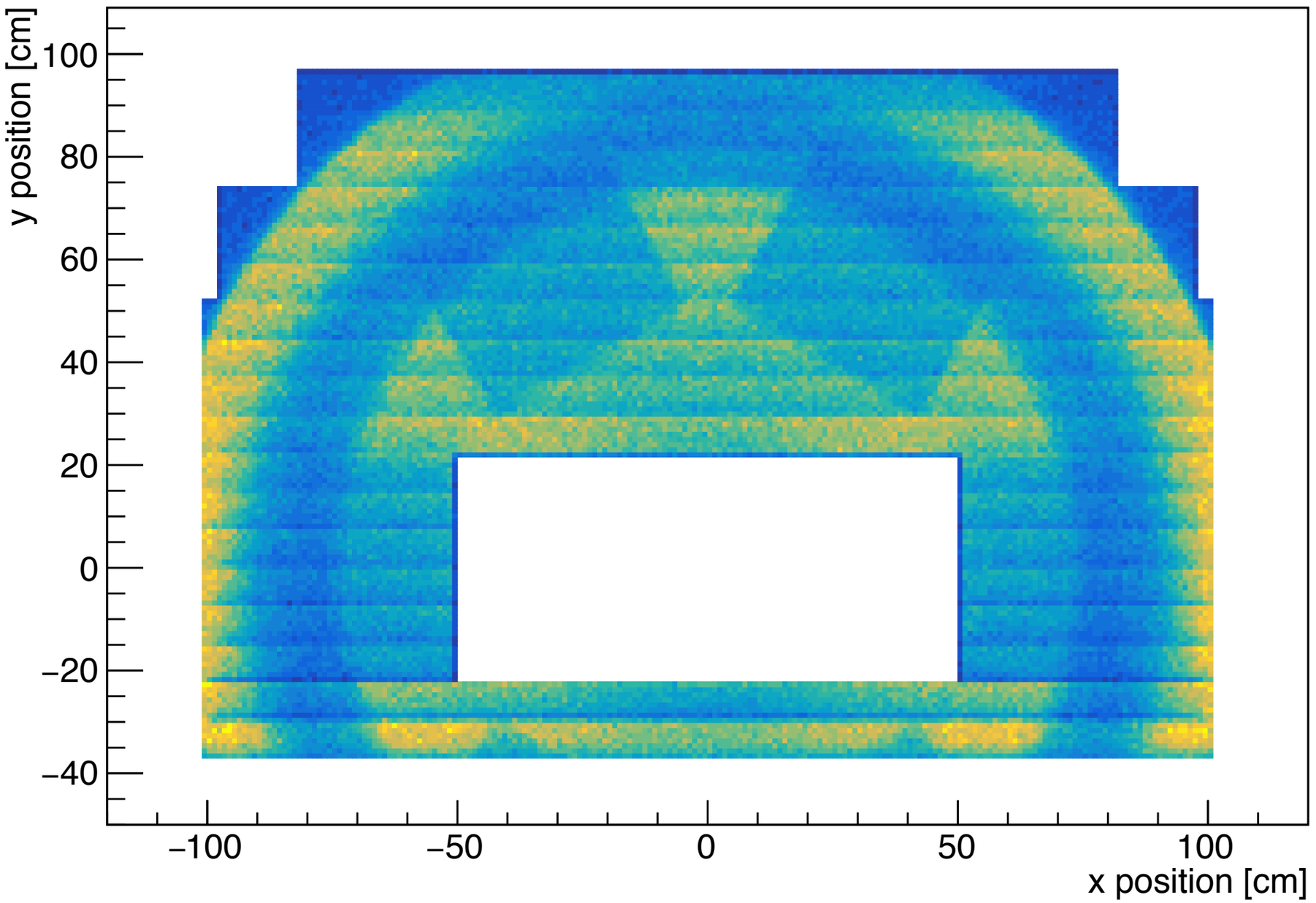


Re-scattering:



Re-scattering:

Hit pattern on BAND with an isotropic generator, n 250 MeV/c



Thank you

Software Status

- Focused on calibration suites
- Using cosmic data to benchmark

Upcoming

- Readout with CLAS
- Reinstallation in Dec - Jan