



Time Stitching and Eventbuilding for Experiment S455 (and S515)

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R3B Collaboration Meeting 2021

First Unpacking Issues

Event Building before/after 2020

Recipe for Time Sorting and Stitching

First Results from S455 (p,2pf) reaction

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The results presented here are based on the experiment s444/s473, which was performed at the beam line/infrastructure Cave C at the GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt (Germany) in the frame of FAIR Phase-0.

GEFÖRDERT VOM



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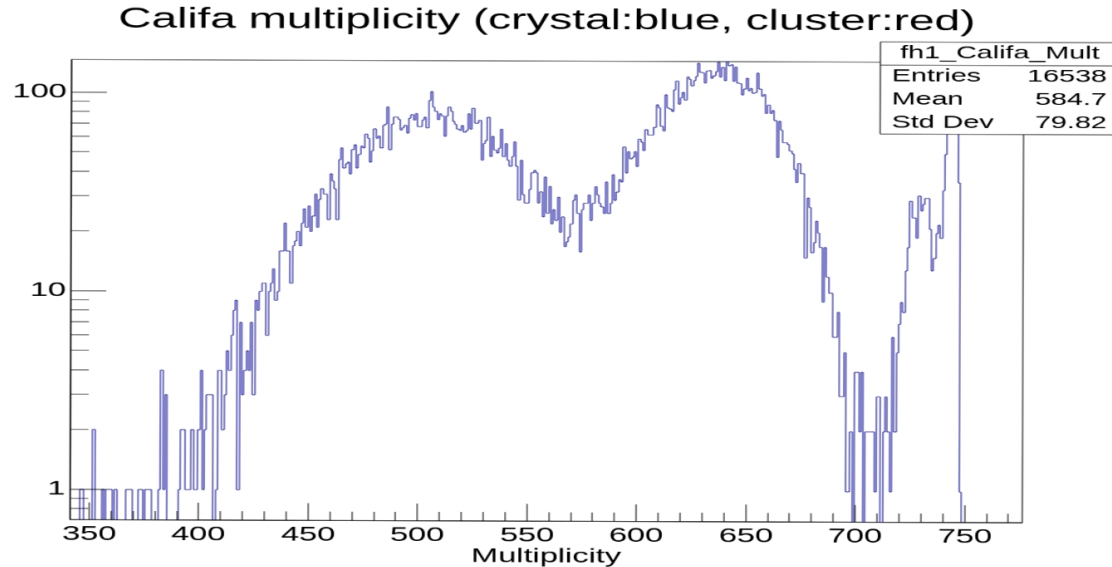




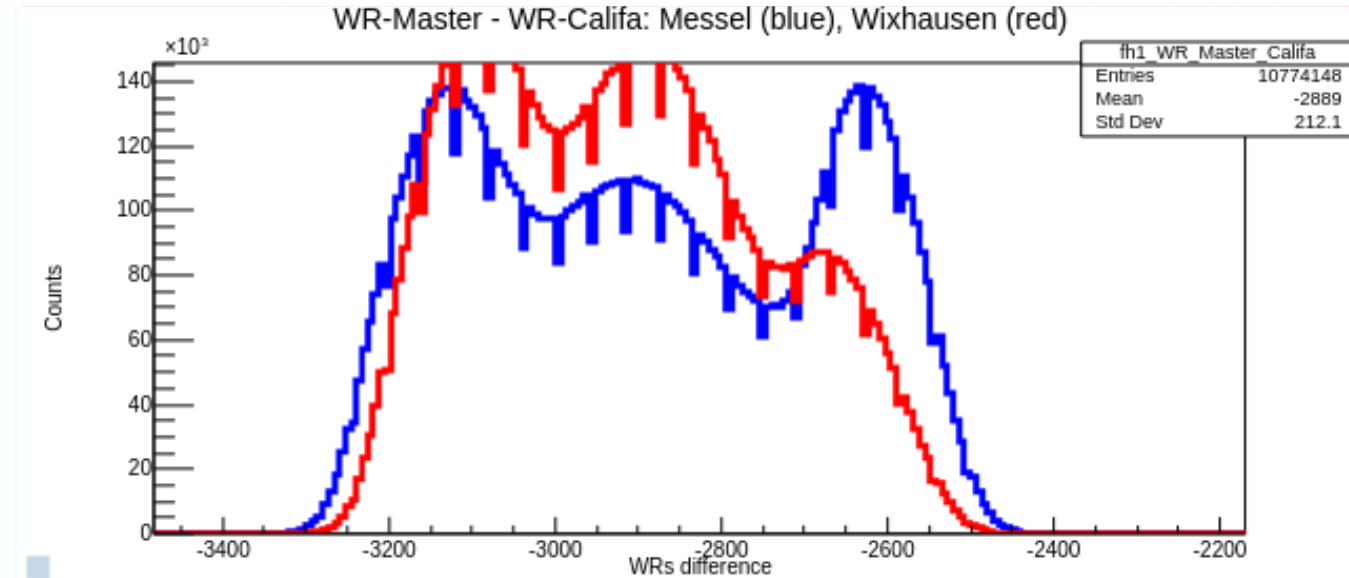
Issues in online/offline Data Analysis starting from S455



When using the known unpacking tools from previous experiment we got:



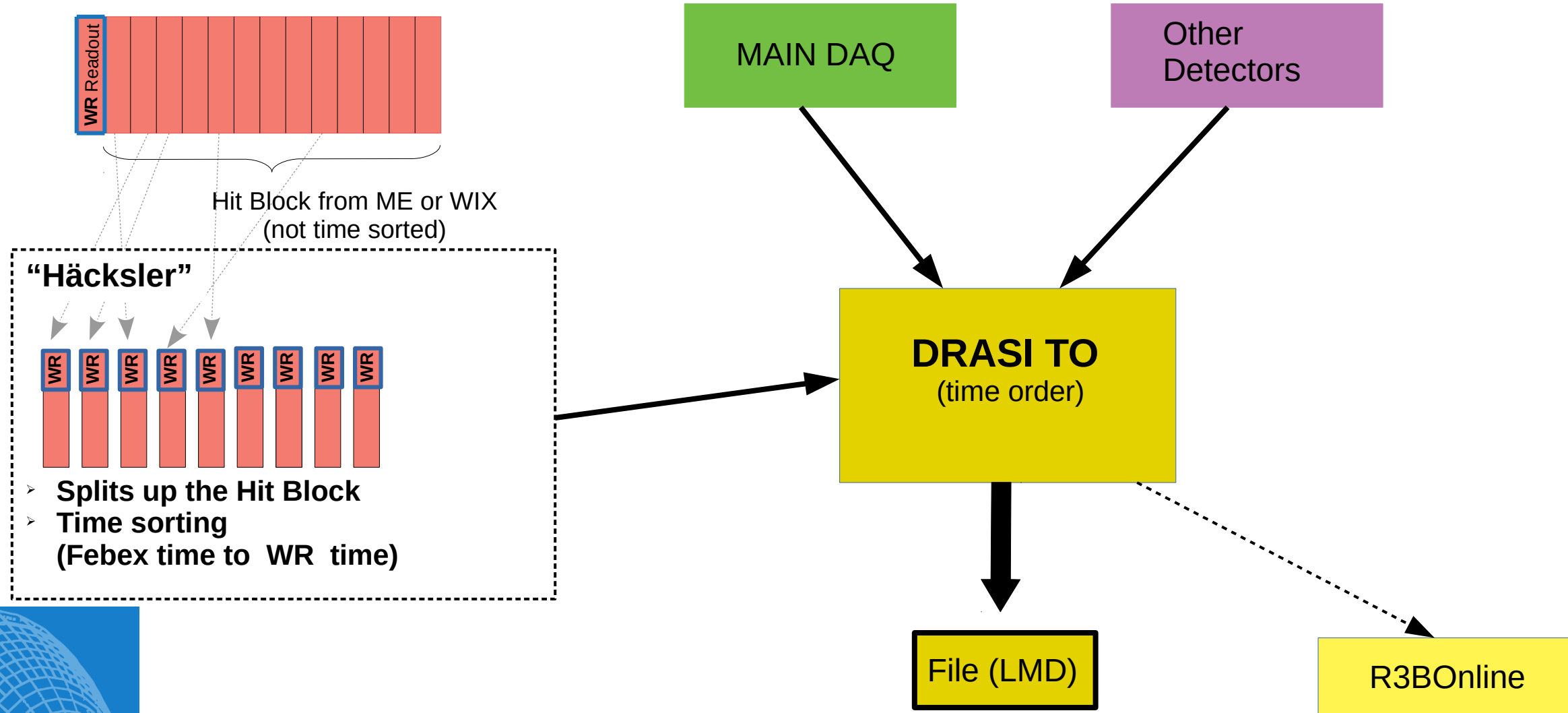
Events with hit-multiplicities > 500 !?

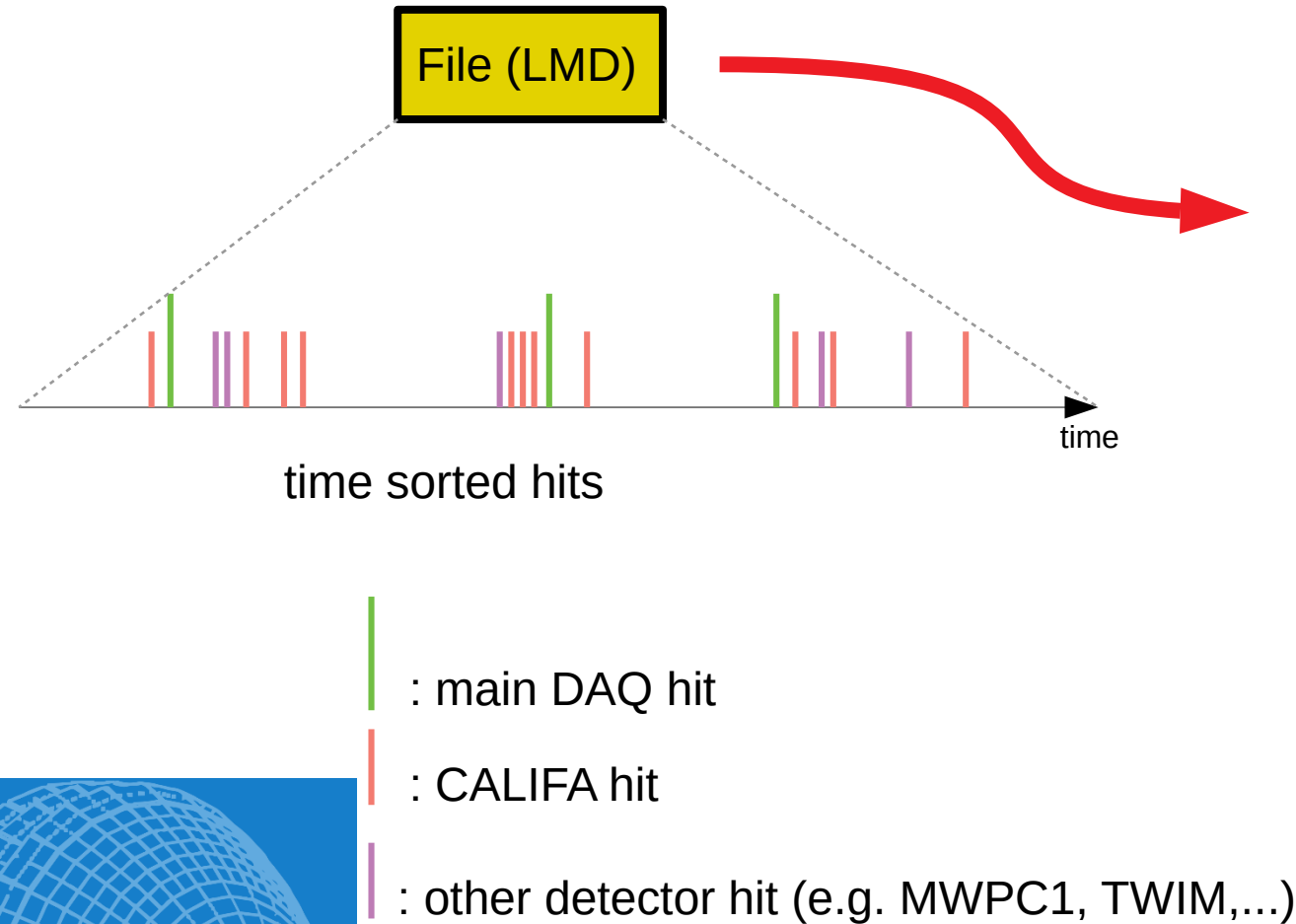


Sharp peak for strong correlation WRM- WRCalifa expected!

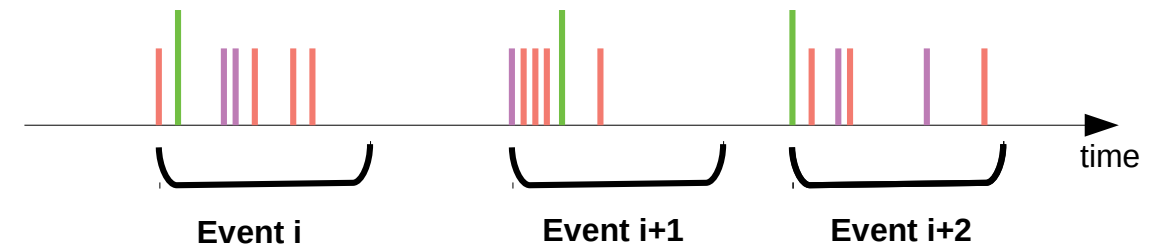
- Is the data corrupted? Has something gone wrong during data acquisition?
- How is data processed and stored to .lmd file?

CALIFA DAQ (Multi Event Readout)





Ucesb Time Stitcher



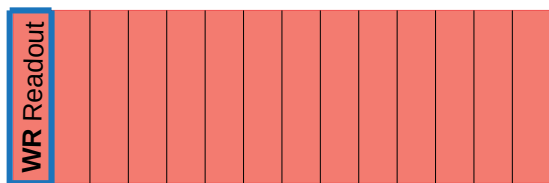
Time Stitching Algorithm

- First detected hit opens event window
- Time Stitcher **does not distinguish** between CALIFA, Main DAQ,.. hits
- Event window is closed after predefined time (eg. 8 μ s)



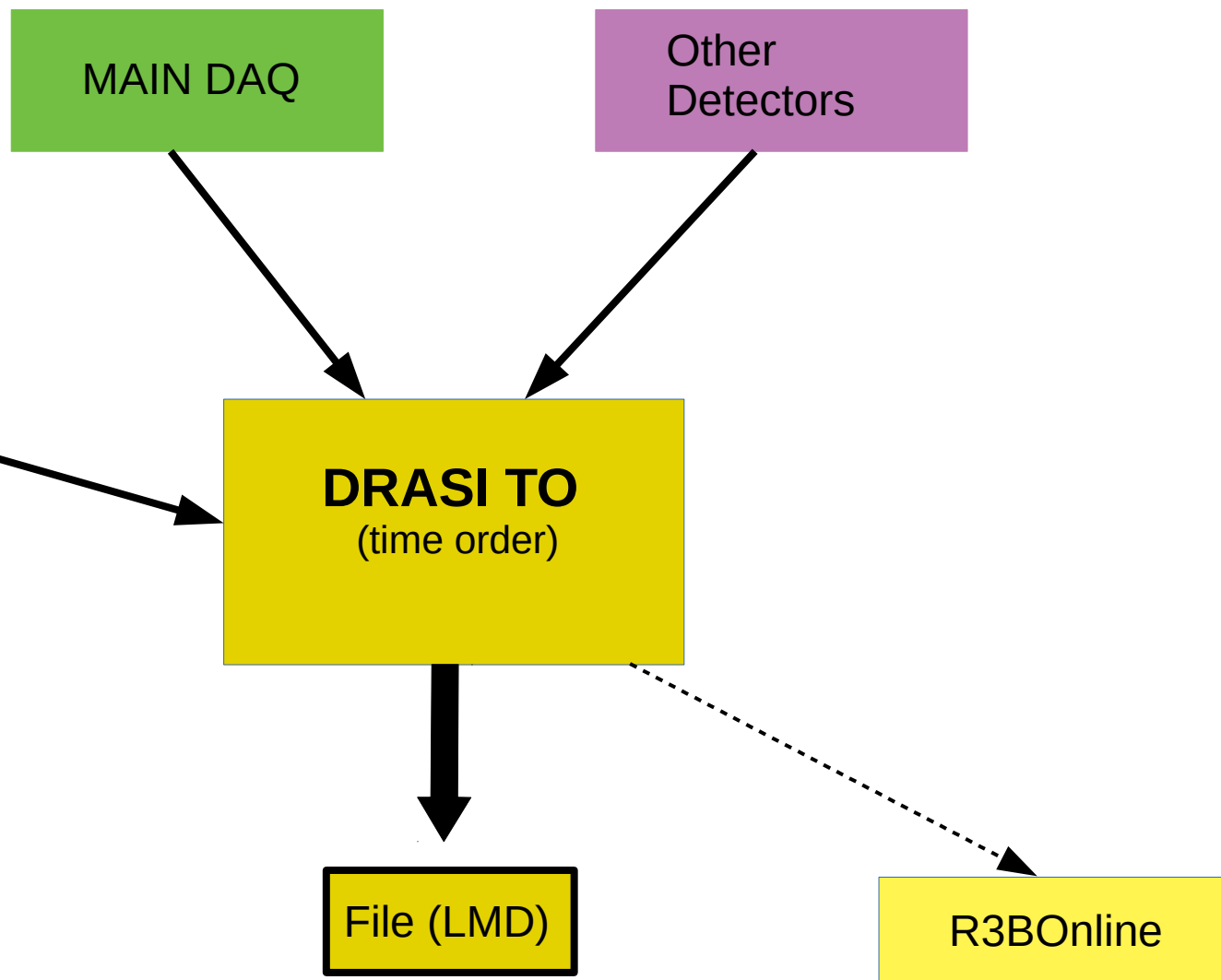
Data Acquisition/Event Building since 2021

CALIFA DAQ (Multi Event Readout)




Hit Block from ME or WIX
(not time sorted)

NO HÄCKSLER!



File (LMD)

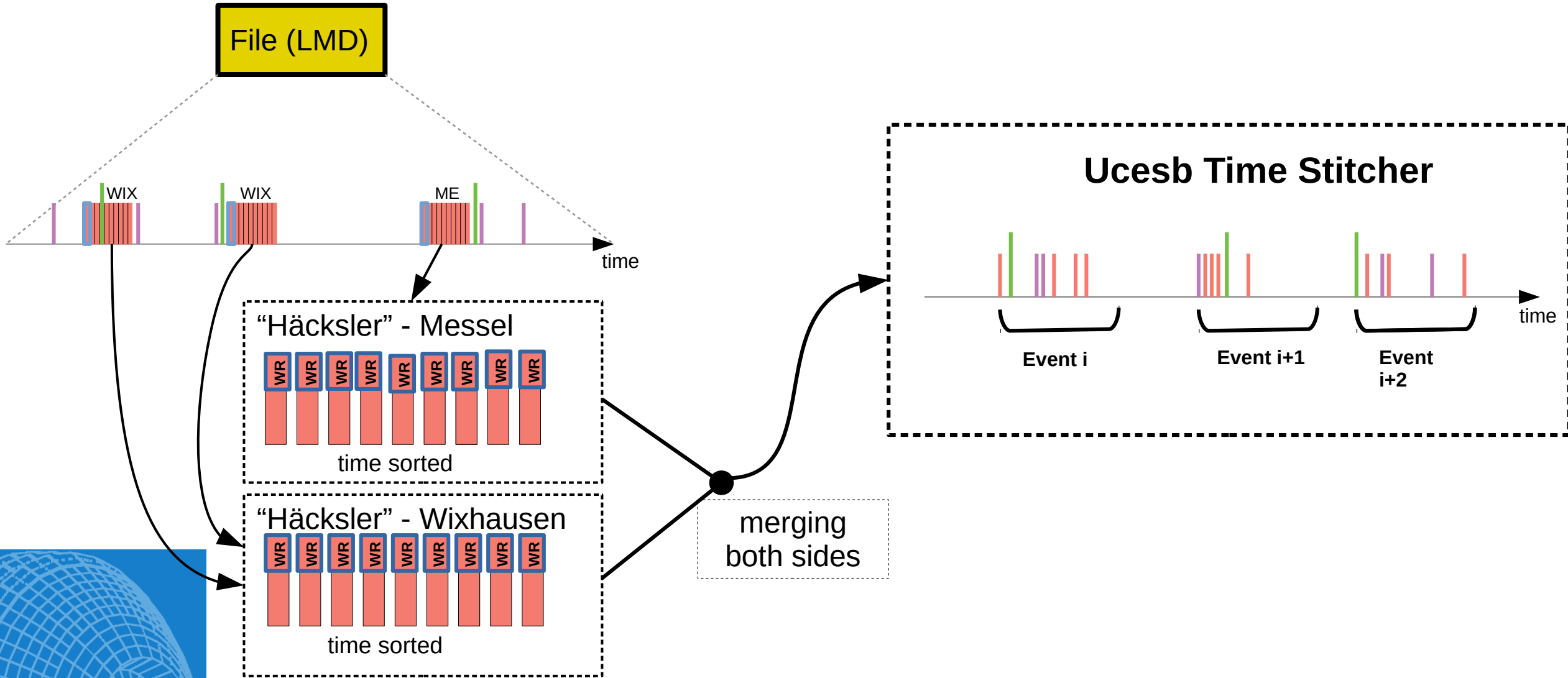


- CALIFA Hits are collected to Hit Blocks (Messel or Wixhausen)
- Hit Blocks are sorted according to the WR Readout timestamp ()
- **Hits inside Block are not time sorted !**

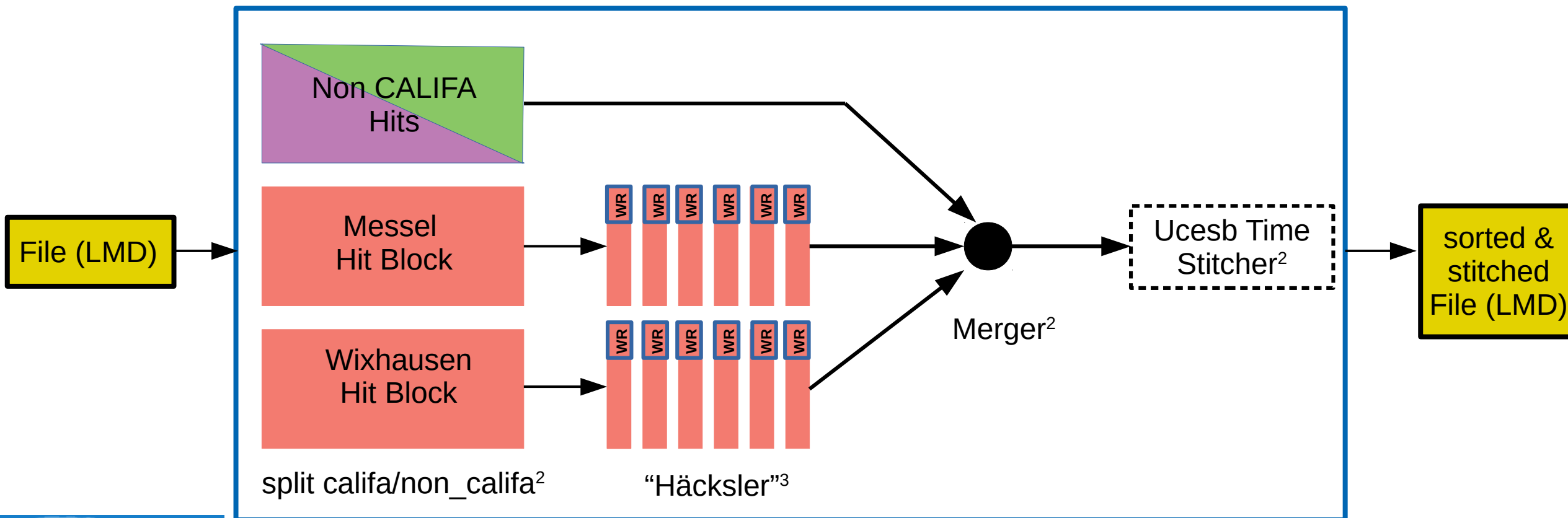


CALIFA single hit time sorting needed!





`califa_merge_stitch.bash`¹



¹You can find it: `/u/land/lynx.landexp/202105_s494/scripts/califa_merge_stitch.bash`

²Unpacker: `/u/land/klenze/ucesb_gcc6/empty/empty`

³Unpacker: `/u/land/landexp/202105_s494/x86l-76/daq_bootstrap/ucesb_wip/empty/empty`



How to use the script



Location:

Always use the newest version you find in: `/u/land/lynx.landexp/202105_s494/scripts/califa_merge_stitch.bash`

Call Parameters:

- an input, either a file path, stream of trans server
- an output for the merged data (*.lmd file; " " for "no output; ucesb - -server option)
- an output for the stitched data (*.lmd file; " " for "no output; ucesb - -server option)

Example:

```
califa_merge_stitch.bash run10.lmd " " stitched_run10.lmd
```

Input .lmd file

No output merged data

Output .lmd stitched data

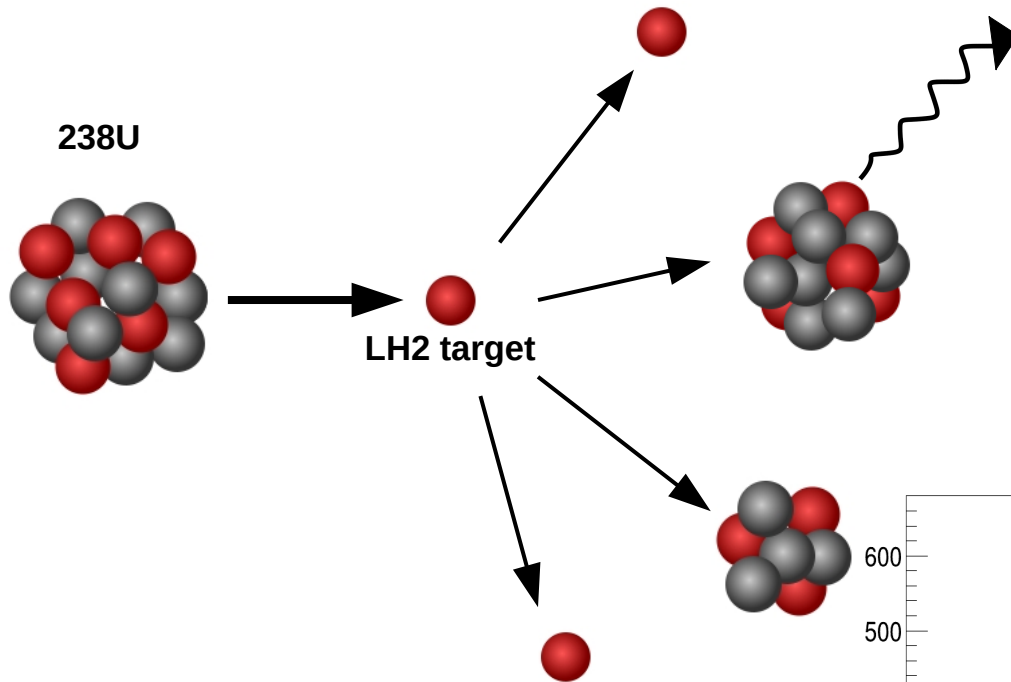




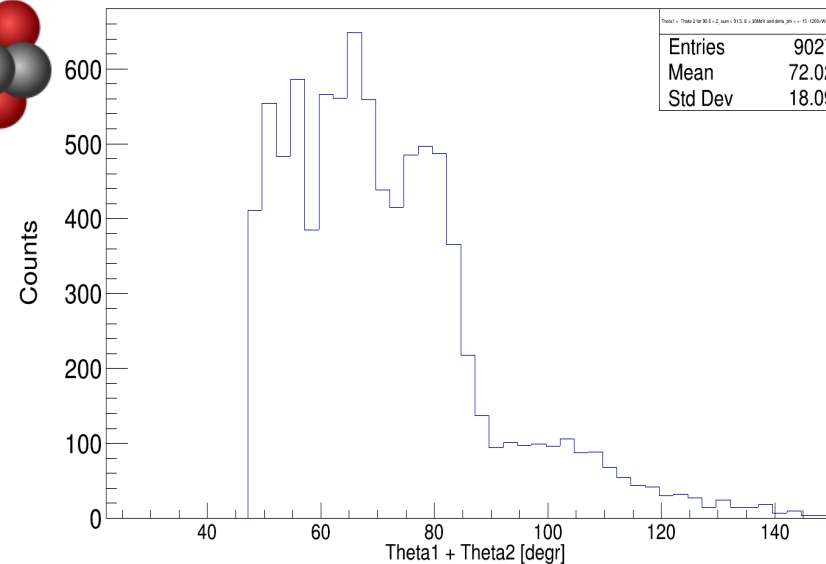
Looking again at S455 Data



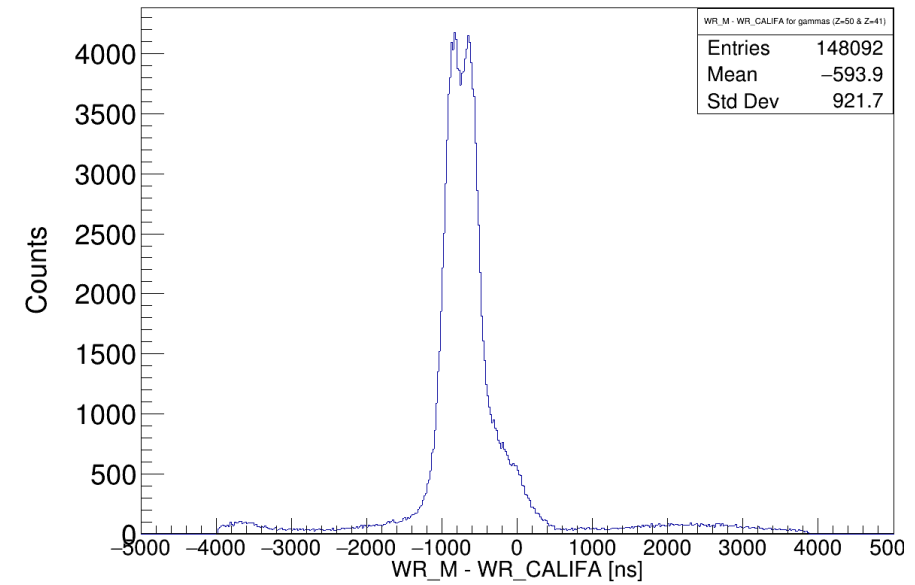
^{238}U fission via quasi-free-scattering (p,2pf)



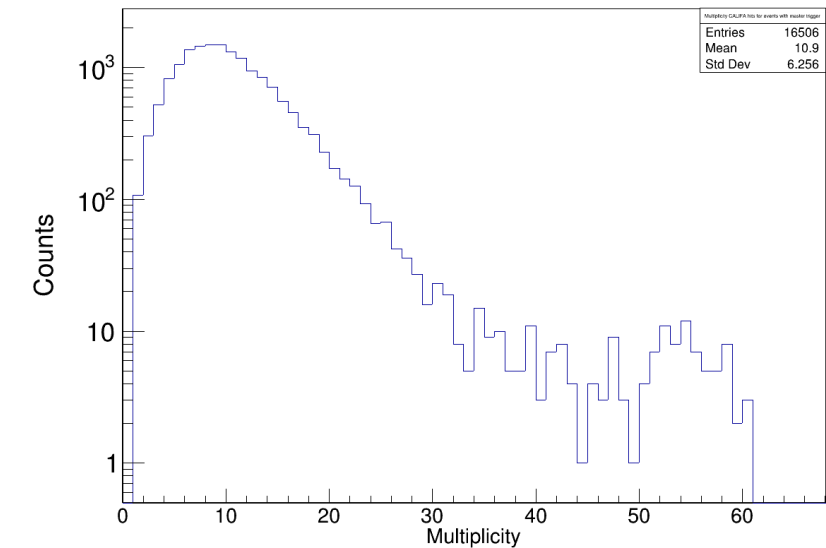
Summed θ angle of two protons:



WR_M - WR_CALIFA for gammas (Z=50 & Z=41)



Multiplicities:

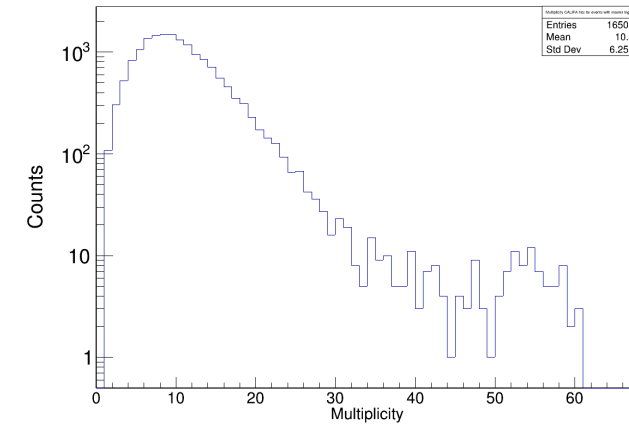
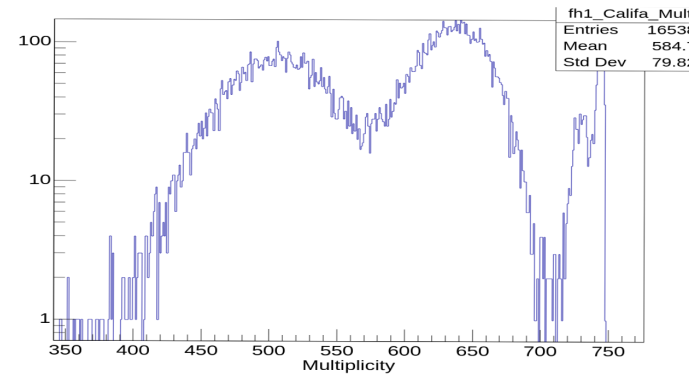




Summary & Outlook



- We successfully unpacked the S455 data



- Well tested and user friendly Time Sorting and Stitching script is available:
`/u/land/lynx.landexp/202105_s494/scripts/califa_merge_stitch.bash`
- Same procedure for experiments after S455 (e.g. 515) → this has to be accurately tested
- CALIFA upexps code was recently unified, experiment independent with one mapping file for all experiments





Thank you!

CALIFA @ Technical University of Munich (TUM)

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Tobias Jenegger





Backup

