Time Stitching and Eventbuilding for Experiment S455 (and S515)

Tobias Jenegger

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

Supported by BMBF 05P15WOFNA and 05P19WOFN1.

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.

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FAIR Phase 0 Research Program

TUM Members:
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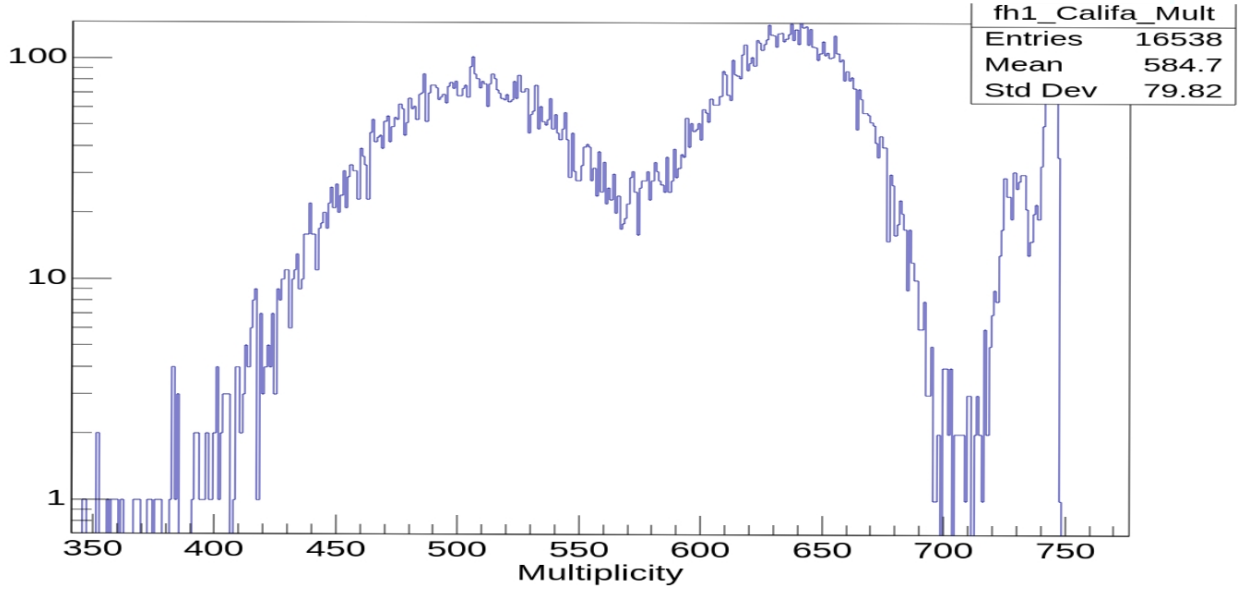
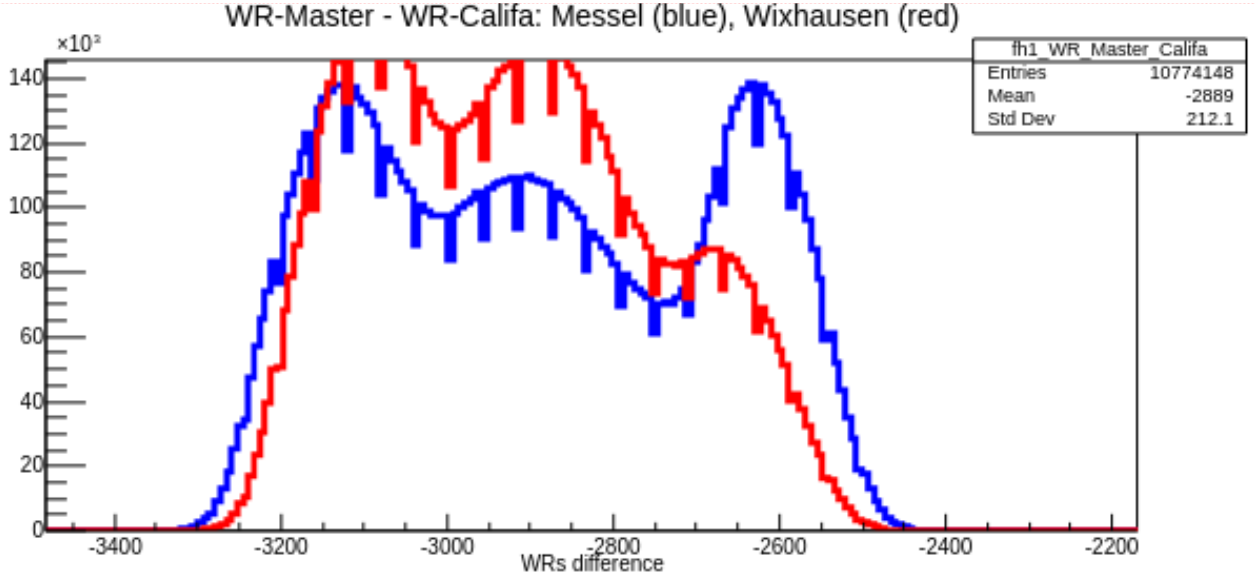
Issues in online/offline Data Analysis starting from S455

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





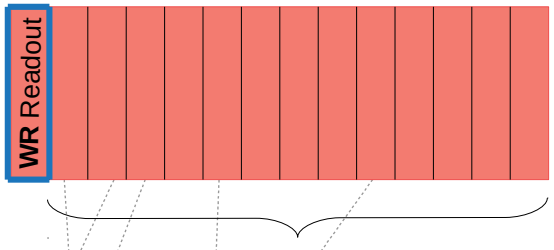
Events with hit-multiplicities > 500 !?

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?

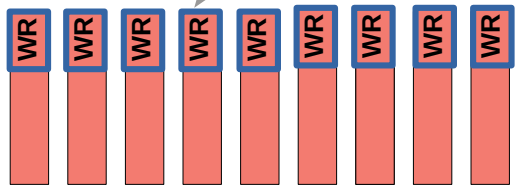
Data Acquisition/Event Building until 2020

CALIFA DAQ (Multi Event Readout)



Hit Block from ME or WIX
(not time sorted)

“Häcksler”



- **Splits up the Hit Block**
- **Time sorting (Febex time to WR time)**

MAIN DAQ

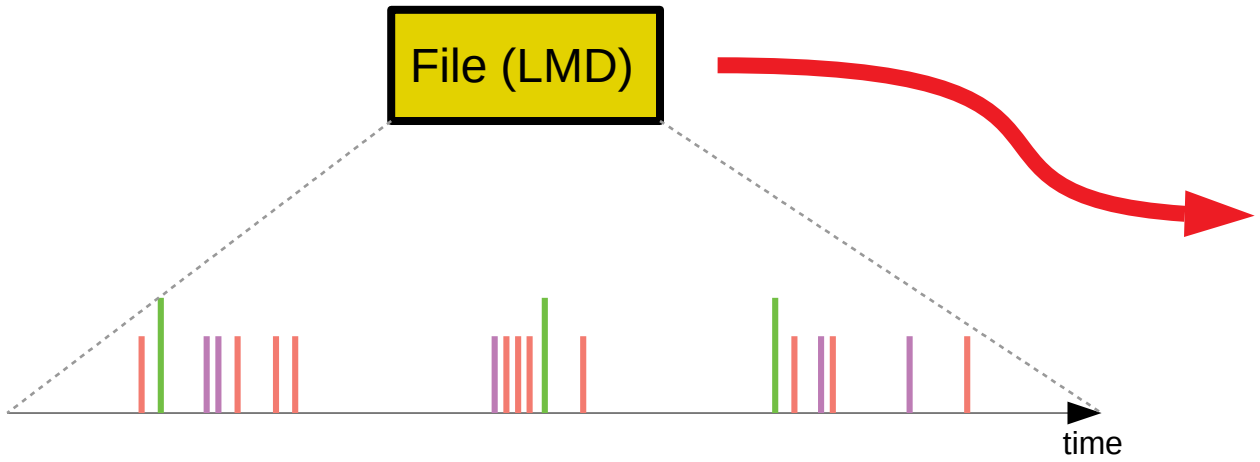
Other Detectors

DRASI TO
(time order)

File (LMD)

R3BOnline

Offline Time Stitching until 2020



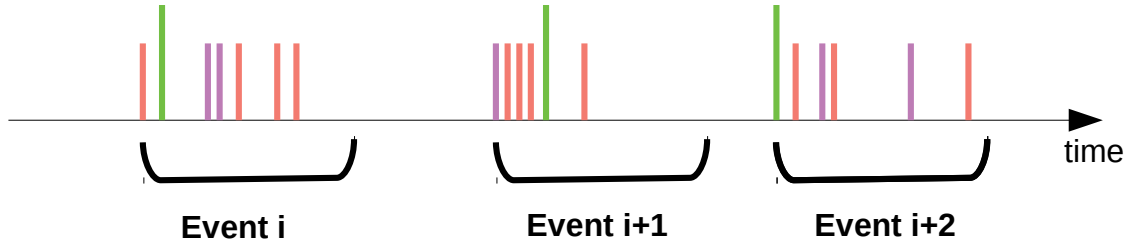
time sorted hits

: main DAQ hit

: CALIFA hit

: other detector hit (e.g. MWPC1, TWIM,...)

Ucesb Time Stitcher

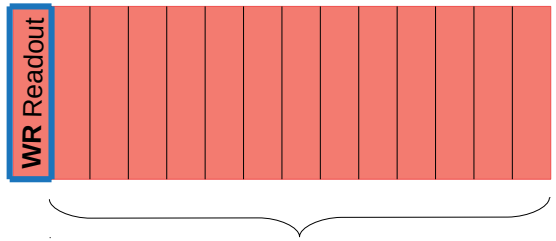


Time Stitching Algorithm

- 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 µs)

Data Acquisition/Event Building since 2021

CALIFA DAQ (Multi Event Readout)



Hit Block from ME or WIX
(not time sorted)

NO HÄCKSLER!

MAIN DAQ

Other Detectors

DRASI TO
(time order)

File (LMD)

R3BOnline

Output LMD File since 2021

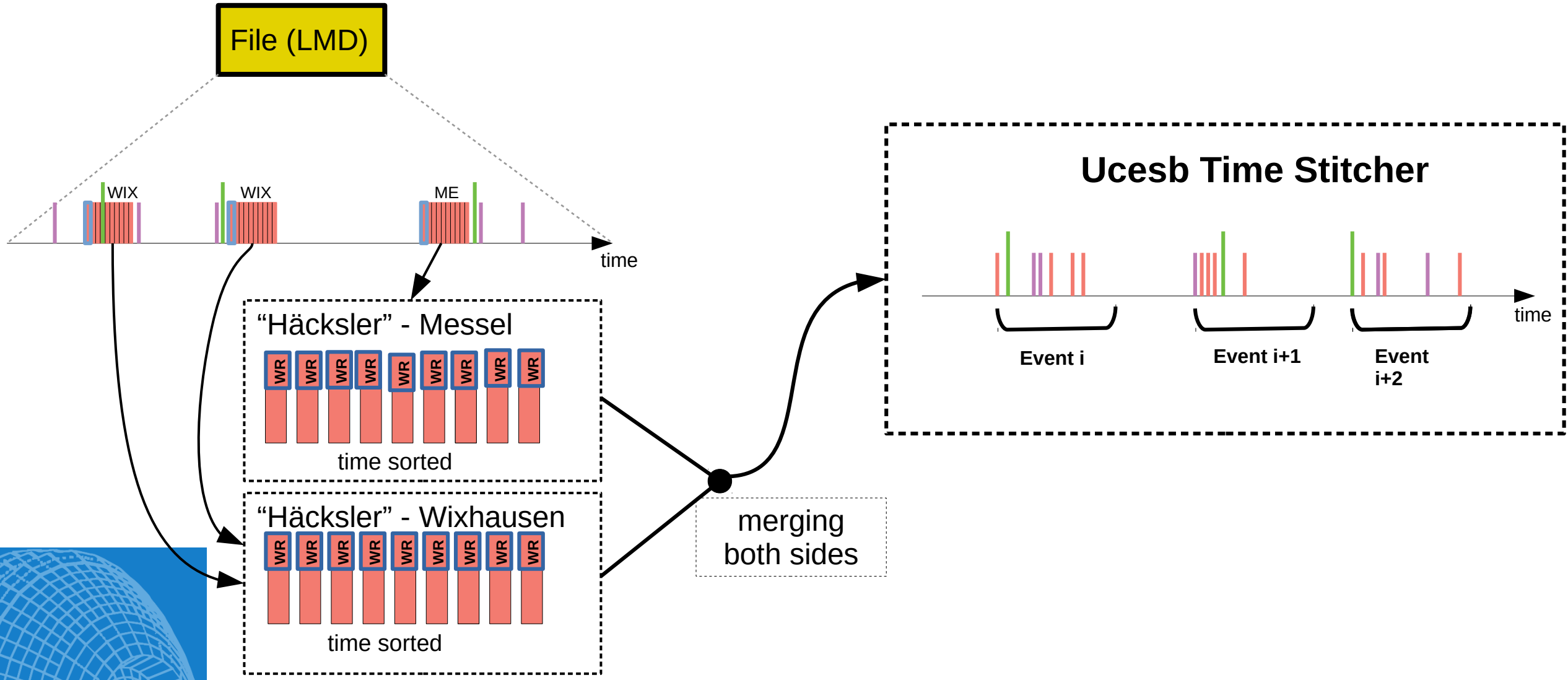
File (LMD)

- 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 !**

⬇

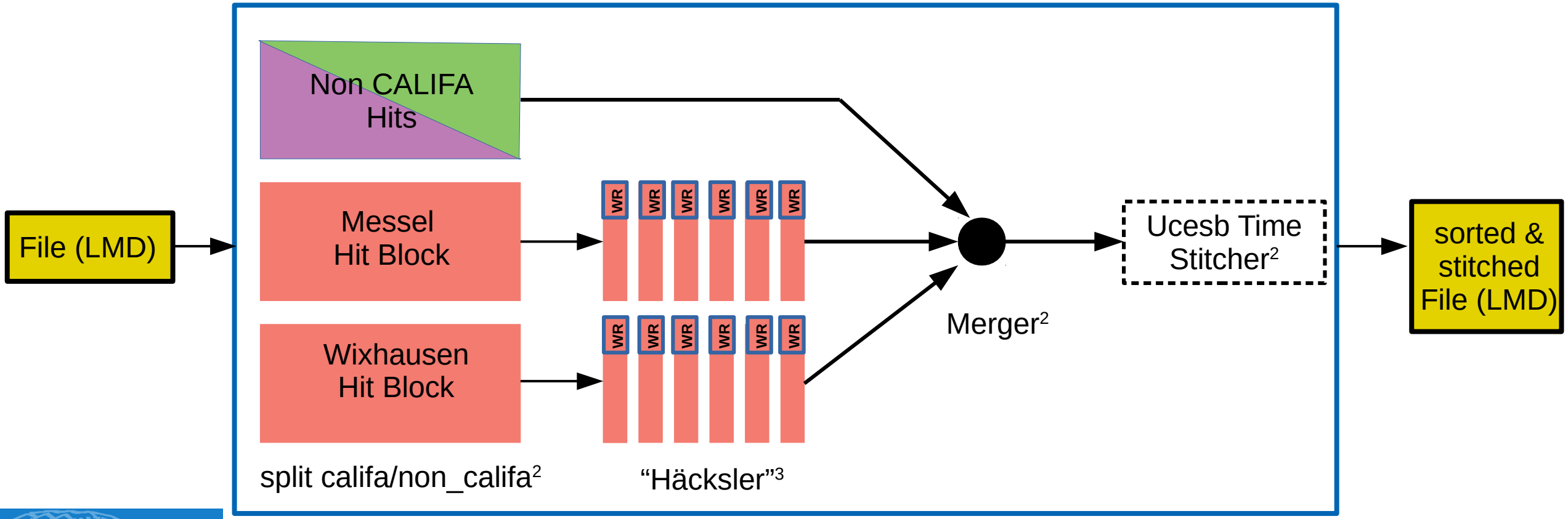
CALIFA single hit time sorting needed!

Offline Time Sorting and Stitching since 2021



Time Sorting and Stitching with Philipp‘s script

califa_merge_stitch.bash[1]



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

[2]Unpacker: */u/land/klenze/ucesb_gcc6/empty/empty*

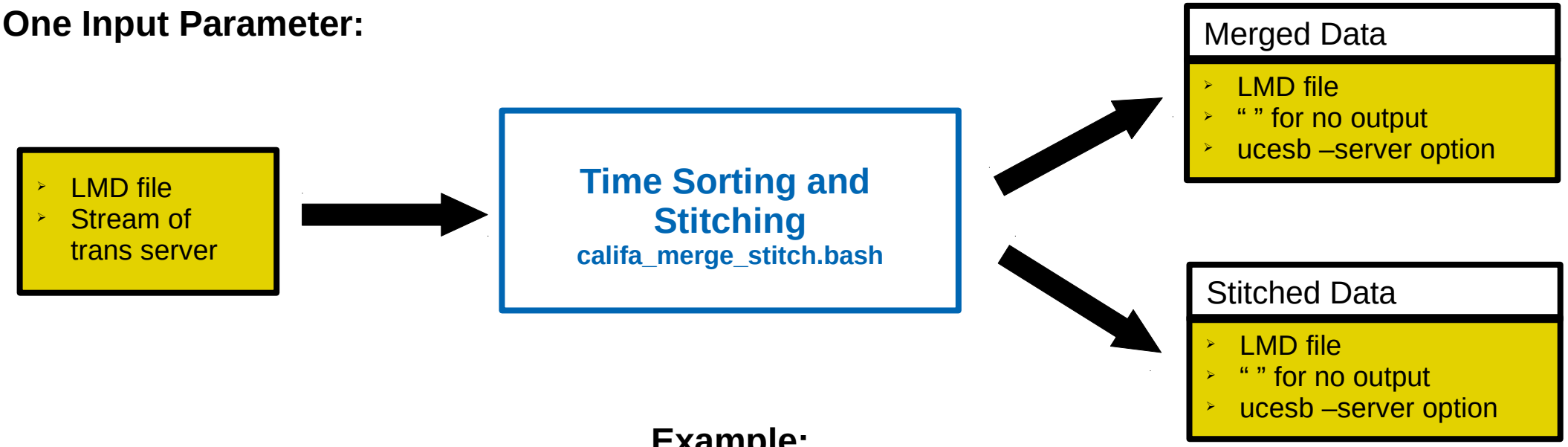
[3]Unpacker: */u/land/landexp/202105_s494/x86l-76/daq_bootstrap/ucesb_wip/empty/empty*

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*

Two Output Parameters:

One Input Parameter:



Example:

califa_merge_stitch.bash run10.lmd “ “ stitched_run10.lmd

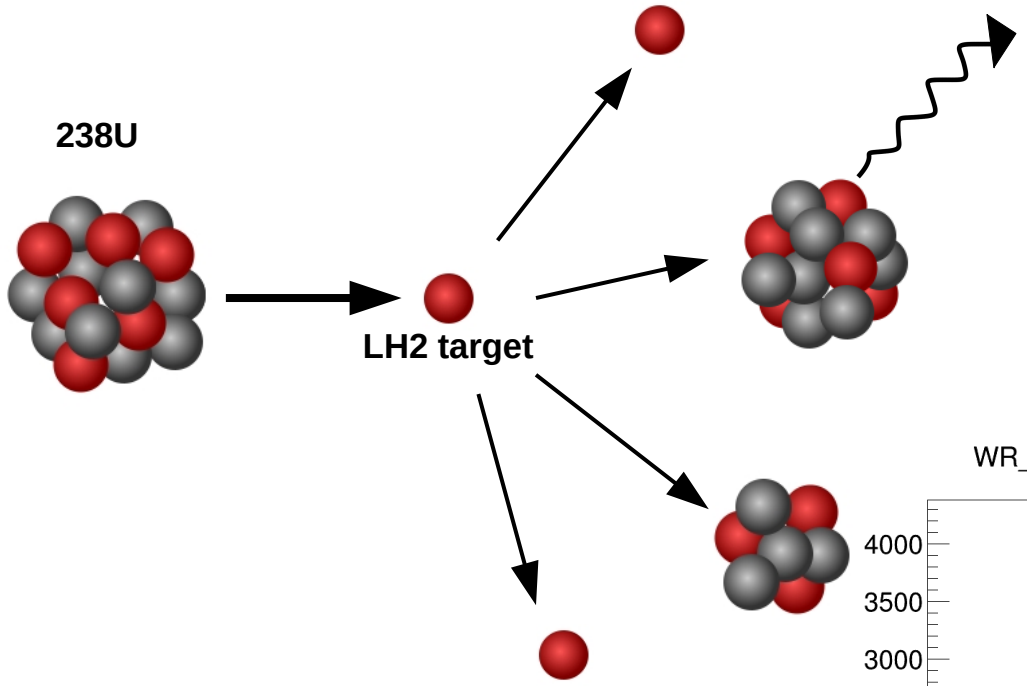
Input .lmd file

No output merged data

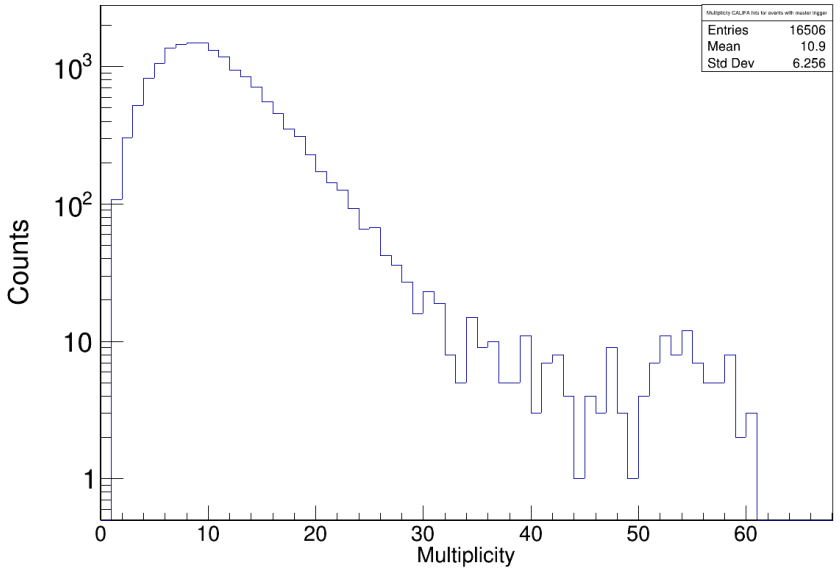
Output .lmd stitched data

Looking again at S455 Data

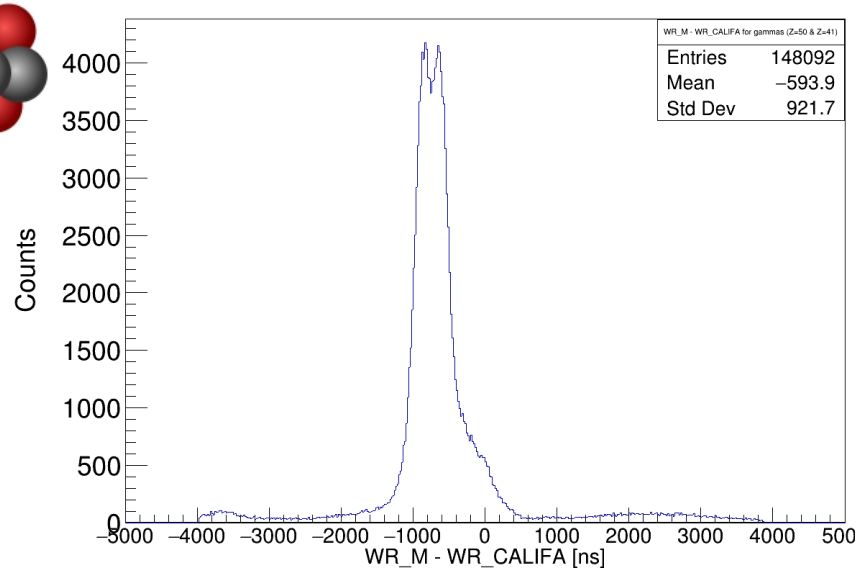
238U fission via quasi-free-scattering (p,2pf)



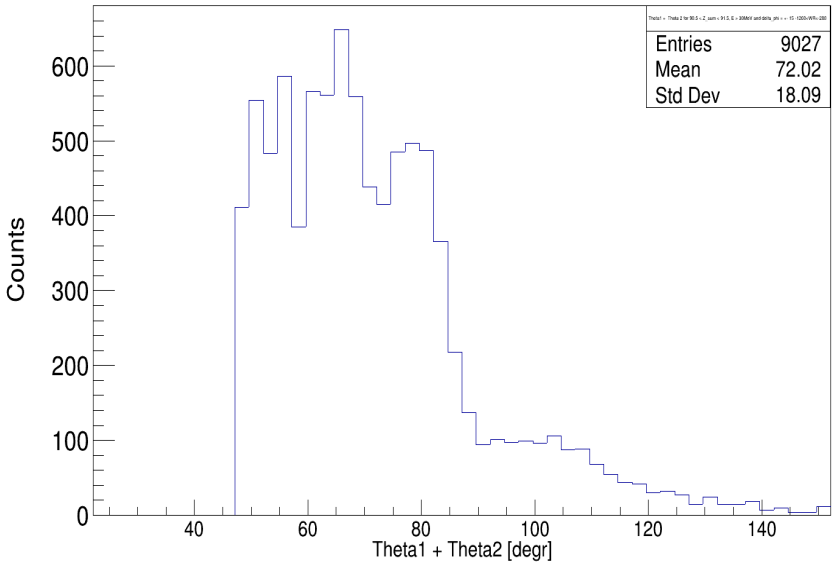
Multiplicities:



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

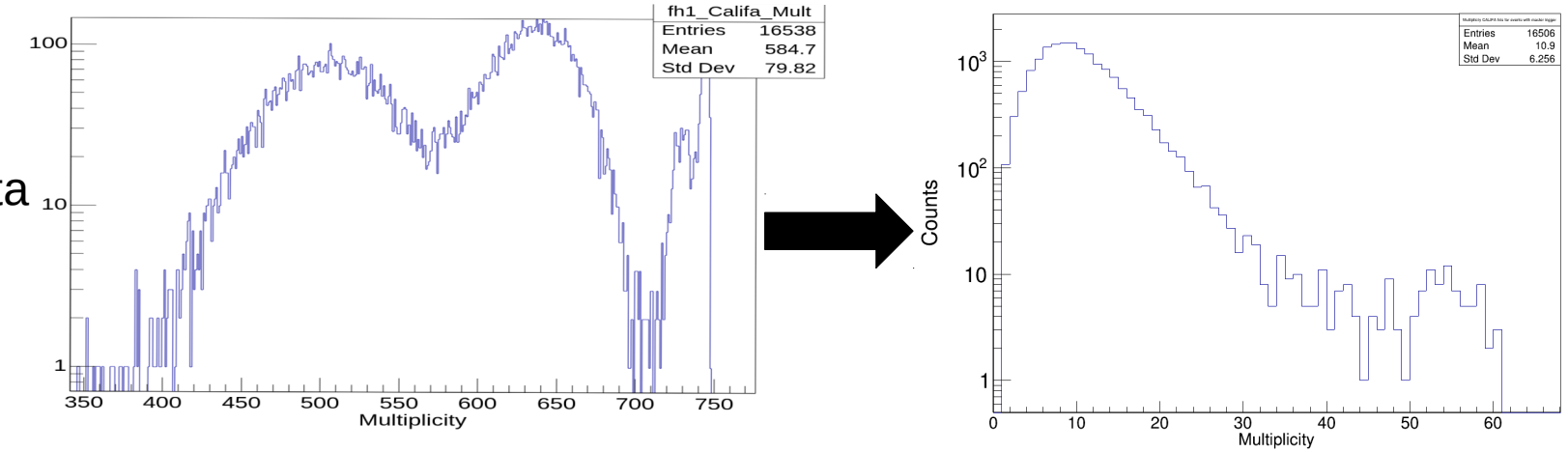


Summed θ angle of two protons:



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. S515)

- CALIFA upexps code was recently unified, experiment independent with one mapping file for all experiments

Thank you!

CALIFA @ Technical University of Munich (TUM)

Roman Gernhäuser, Lukas Ponnath, Philipp Klenze, Tobias Jenegger

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Backup