

SRO Calibrations using SVT

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Streaming calibration using tracks

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- ▶ Tracking is the prerequisite for many calibrations according to spreadsheet:

- ▶ <https://docs.google.com/spreadsheets/d/1Rb5Cdjthkfh4IWWxFwHgiHNtMs5cDxcahTTUN394cJ8/edit?usp=sharing>

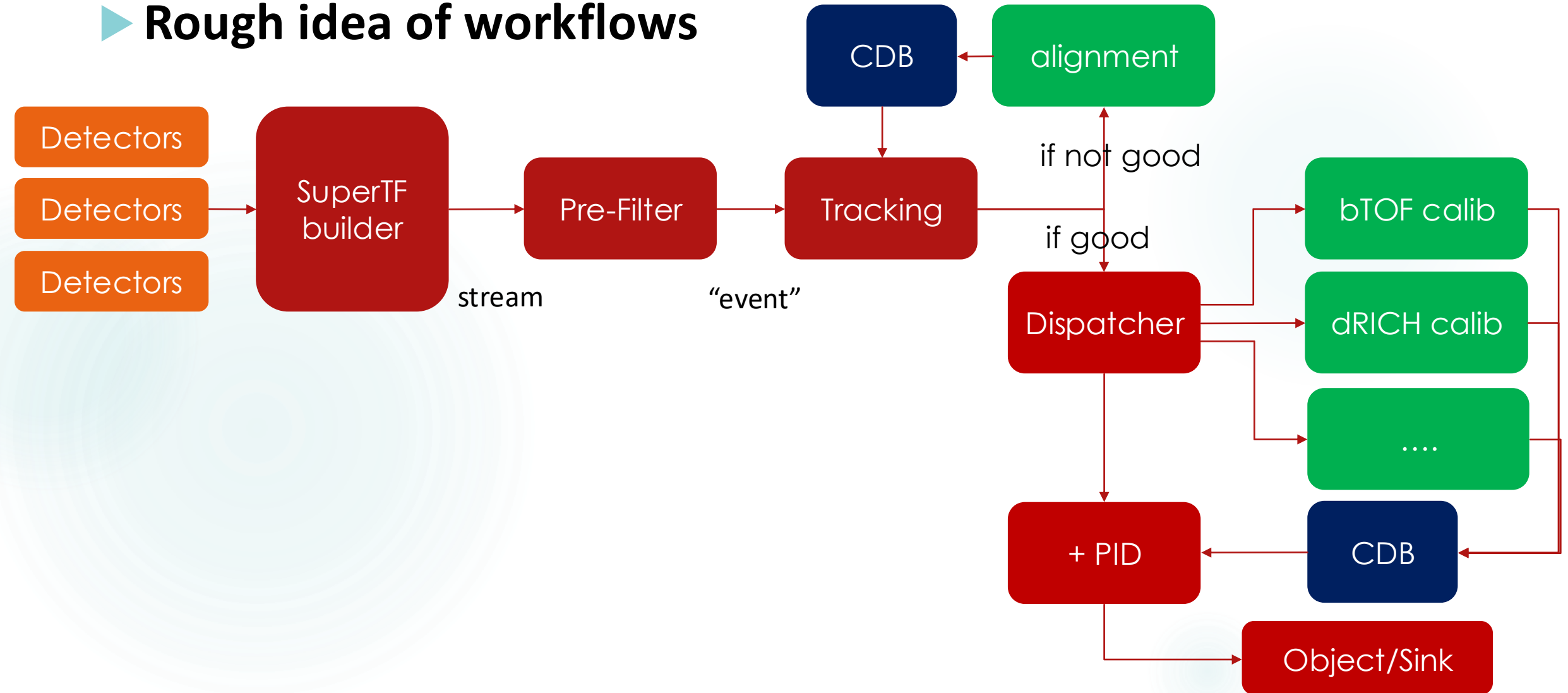
- ▶ Example:

- ▶ bTOF and dRICH require tracks for their alignment and position dependent corrections.
 - ▶ bEMC requires DIS electrons
 - ▶

Workflows

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► Rough idea of workflows



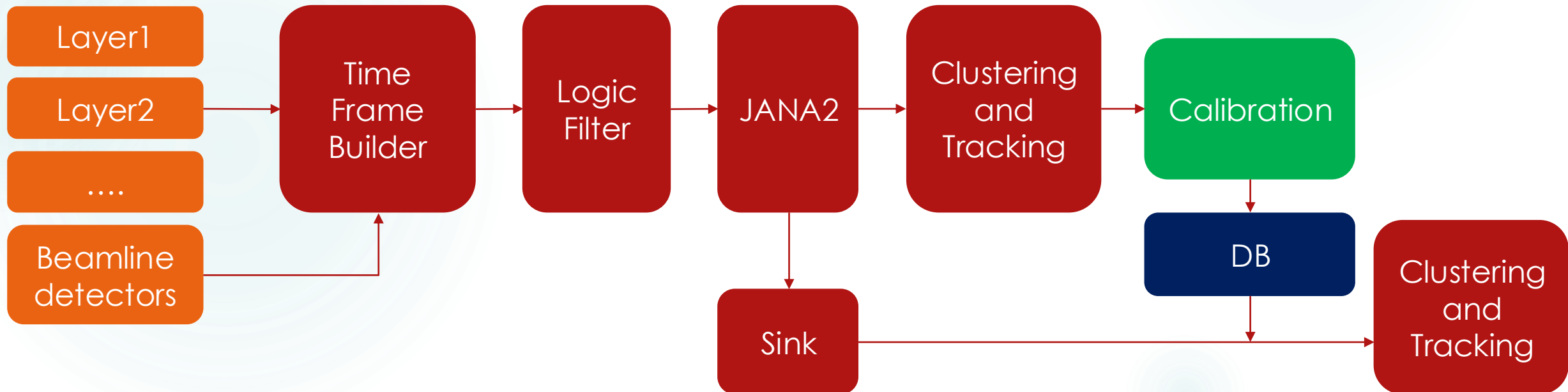
Using SVT beamtest opportunities

- ▶ Rather than discussing streaming calibration at a conceptual level, I would like us to focus on a concrete implementation and demonstrator.
- ▶ Following recent discussions with the Tokyo/LBNL team, if we receive the ER2 MOSAIX sensors from CERN, we plan to organize a beam test in Japan (PF-AR@KEK, electron beams up to 5-6 GeV).
- ▶ We would like to use NestDAQ (and transport to JANA2) and implement mock-up of alignment calibration workflow.
- ▶ This would provide an opportunity to demonstrate an end-to-end streaming calibration workflow using real detector data.

To do list

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1. SVT readout integration into NestDAQ
2. Conversion to JANA2 through zeroMQ
3. Alignment algorithm development (inherit from corryvreckan?) and implementation in JANA2



To do list

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4. **File reply of the past telescope beamtest data for item 2&3**
 - ▶ **MIMOSA telescope at DESY for bTOF beamtest**
 - ▶ **ITS3 related beam test in PF-AR or CERRN**

Another possibility

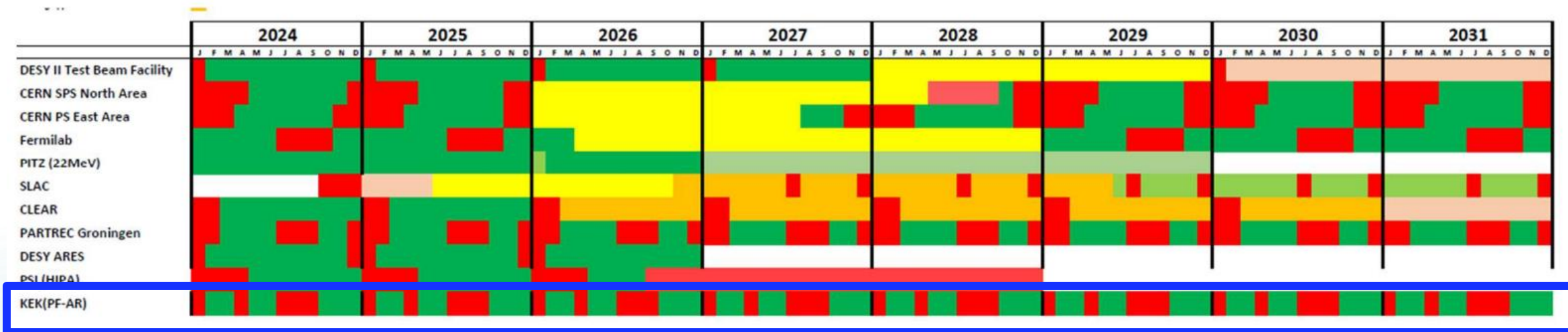
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- ▶ Use MVTX from sPHENIX (Ming et al.)
 - ▶ Need to use sPHENIXX FELIX cards
- ▶ Take cosmics in nestDAQ and perform calibration using cosmics

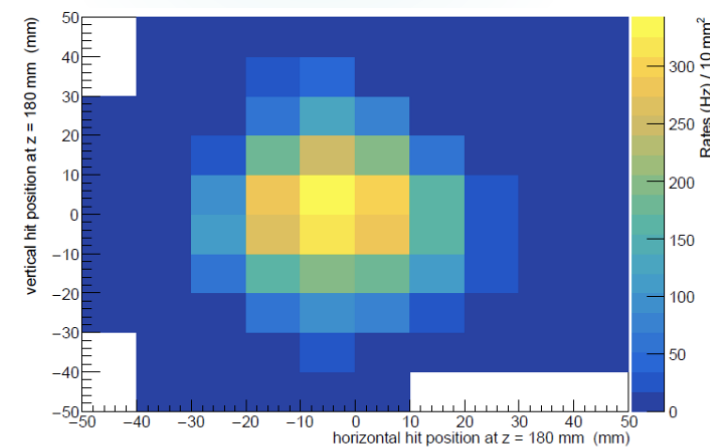
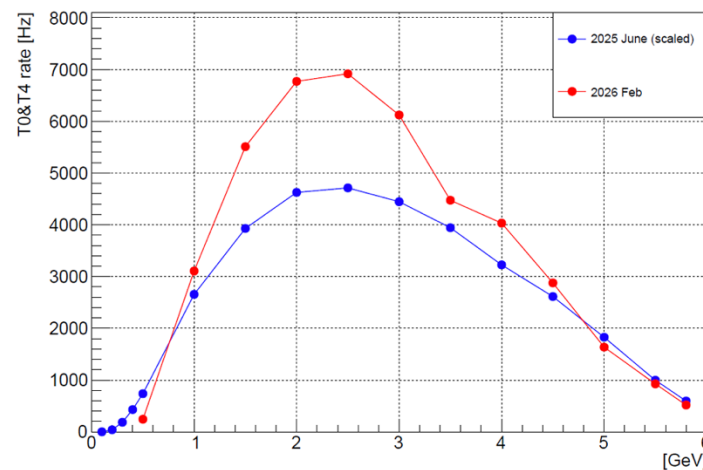
backup

KEK PR-AR beamline

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- ▶ PF-AR at KEK provides electron beams up to 6 GeV.
- ▶ Typical rate is 350 Hz/cm²
- ▶ Used for BIC and bTOF beamtests

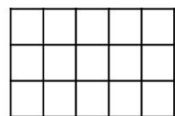


Peak intensity @ 10 mm x 10 mm
350 Hz

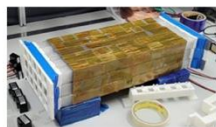
KEK PR-AR beamline

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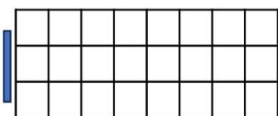
BIC



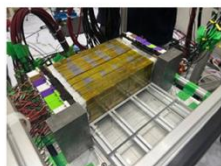
Aug 2024 CERN PS



First Pb/SciFi prototype production in Korea
First beam test
Successful data taking

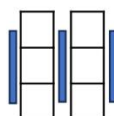


Mar 2025 KEK PF-AR TBL



More ($\sim 15X_0$) Pb/SciFi
Improved energy resolution
New DAQ, Trigger, Hodoscope, Calibration
Extension cable test

2024ARTBL017

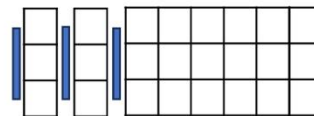


June 2025 KEK PF-AR TBL



AstroPix synchronization with trigger time
Electron shower on AstroPix between Pb/SciFi

2025ARTBL004



July 2025 at CERN PS



synchronized data taking of AstroPix + Pb/SciFi
Proof-of-principle imaging of electrons and pions
Resolution fulfill the EIC requirement



AC-LGAD

