

## **Real-Time Calibrations for FAIR**

- Future detectors at FAIR CBM and PANDA
- will use <u>Synchronous reconstruction</u>,
- compress the data from TB/s to GB/s
- with <u>High-Level Triggering</u>.
- Reconstruction needs to be <u>fast and precise</u>.





Calibrations need reconstructed tracks.





# **Physics-Inspired Neural Network Solution**

### Synchronous reconstruction







**Online calibrations** 

- Calibration factors
- Recommended settings (HV)
- Anomaly detection

	New beamtime

## A Step Toward Smart Slow Control



- Currently tested for 4x6 drift chambers gain calibration  $\bullet$ on real beam & cosmic data with HADES experiment.
- GCN LSTM architecture shows performance compatible with  $\bullet$ offline calibrations.
- Prediction time ~1s.  $\bullet$
- Integrated with ROOT + ONNX backend.
- Supports automated HV tuning and anomaly detection moving to Al-guided operations of experiments.





Github project Conference proceedings

EuCAIFCon

