

# TU Dortmund in TA5

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- Experience: Trigger in hadron colliders (LHCb)

- LHCb trigger system: run 1 and 2
- LHCb run 3
- SMARTHEP: [smarthep.org](http://smarthep.org)

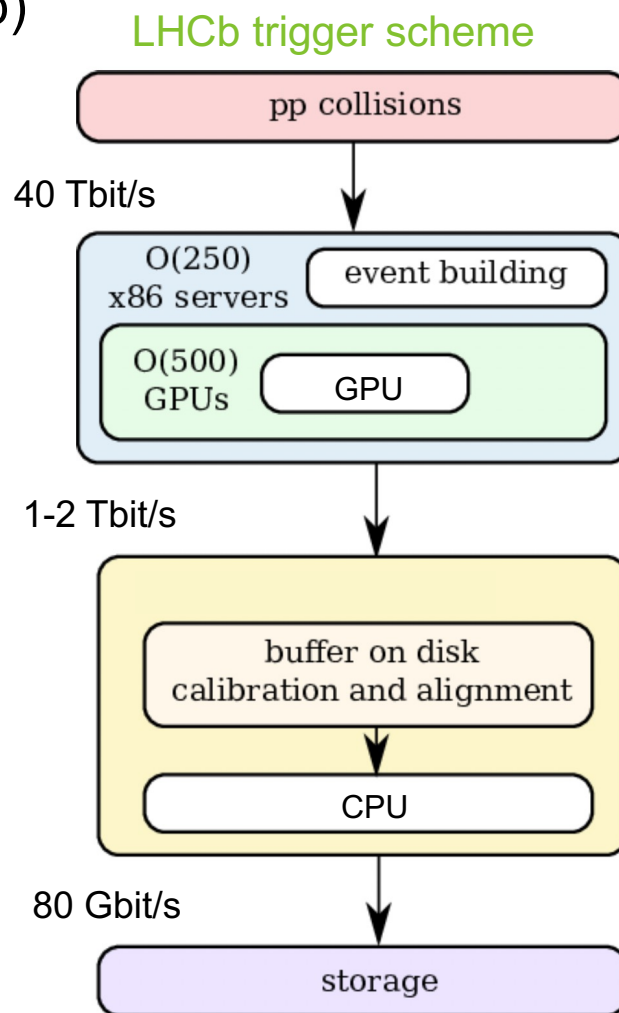


- Research focus TuDo

- Reconstruction in real time
- Alignment of instruments
- GPU implementation
- Machine learning in real time context (and offline context)

- Interest in PUNCH

- WP 5.2: Dynamic filtering
- WP 5.5: Evaluation and validation of instrument response & characteristics



- TA5-WP2

- D-TA5-WP2-1 (31 May 2022): Curation & metadata schemes for dynamic filtering.
- D-TA5-WP2-2 (30 Sep 2022): Strategy concept for identifying highly complex (multi-parametric) signals in huge data streams.
- D-TA5-WP2-3 (31 Dec 2023): Test environment for identifying highly complex (multi-parametric) signals in huge data streams.
- D-TA5-WP2-4 (30 Sep 2024): Generic tools to both convert trained neural networks into efficient HLS/VHDL FPGA firmware optimised for a real-time, low-latency environment and to establish comparable software solutions.
- **D-TA5-WP2-5 (01 Mar 2026): Algorithms for massively parallel real-time sorting, clustering and pattern recognition on specialised hardware.**
- **D-TA5-WP2-6 (01 Mar 2026): Algorithms and Machine Learning methods for filtering and selecting relevant transient/anomalous signals.**
- D-TA5-WP2-7 (30 Sep 2026): Pipeline for anomalous signal detection with low false-alarm probability for multi-messenger follow-up.

- TA5-WP5

- **D-TA5-WP5-1 (30 Sep 2024): Development of machine learning prototypes for anomaly detection and predictive maintenance**
- D-TA5-WP5-2 (30 Sep 2024): Interference recognition and mitigation schemes for transient discovery leading to a robust triggering system
- D-TA5-WP5-3 (30 Sep 2026): Expansion of the concept to a generalized toolkit for predictive maintenance and anomaly detection
- D-TA5-WP5-4 (30 Sep 2026): Evaluation of the machine learning approaches by analyzing false-alarm rates and online feedback

**I am looking forward to collaborate in PUNCH!**