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First experiences with the LHCb heterogeneous software trigger

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Since 2022, the LHCb detector is taking data with a full software trigger at the LHC proton-proton collision rate, implemented in GPUs in the first stage and CPUs in the second stage. This setup allows to perform the alignment & calibration online and to perform physics analyses directly on the output of the online reconstruction, following the real-time analysis paradigm.
This talk will give a detailed overview of the LHCb trigger implementation and its underlying computing infrastructure, discuss challenges of using a heterogeneous architecture and report on the experience from the first running periods in 2022 and 2023.

Significance

This is the first full overview of the 2023 running period of the purely software-based trigger of LHCb, which is also the first year where a large amount of data was processed.

References

Experiment context, if any

LHCb

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