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Low-level reconstruction software and regional unpacking for the CMS strip tracker

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The CMS silicon strip tracker is unprecedented in terms of its size and complexity, providing a sensitive area of $>200 \text{ m}^2$ and comprising 10M readout channels. Its data acquisition system is based around a custom analogue front-end ASIC, an analogue optical link system and an off-detector VME board that performs digitization, zero-suppression and data formatting. These data are forwarded to the CMS online computing farm, which performs reconstruction and provides the high-level trigger (HLT) using tools defined within the offline software framework. The strip tracker geometry and high-multiplicity events combine to create very large data volumes, which must be “unpacked” from a custom format into objects handled by the reconstruction chain. This must be done within stringent time quotas imposed by the available online computing resources. We review the issues and requirements for HLT, solutions for optimizing the low-level reconstruction chain, such as regional unpacking, and results based on simulation and the expected final detector configuration.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

CMS

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