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Recording and reconstructing 10 billion unbiased B meson decays in CMS to probe lepton flavour universality

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Measurements involving rare B meson decays by the LHCb and Belle Collaborations have revealed a number of anomalous results. Collectively, these anomalies are generating significant interest in the community, as they may be interpreted as a first sign of new physics in the lepton flavour sector. In 2018, the CMS experiment recorded an unprecedented data set containing the unbiased decays of 10 billion B mesons. These data allow attempts to measure the R_K , R_{K^*} , and R_ϕ observables, which are considered to be theoretically robust and sensitive to a violation of lepton flavour universality. The accumulation, processing, and validation of this unprecedented data set was delivered with negligible impact on the core physics programme of CMS. Events were recorded with trigger rates in excess of 50 and 5 kHz at L1 and HLT, respectively, and a high average throughput of 2 GB/s. New algorithms have been developed to reconstruct and identify electrons with high efficiency at very low transverse momenta, as low as 0.5 GeV. These algorithms were validated using a pilot reconstruction campaign of $O(10^9)$ events. The entire data set is currently being reconstructed and stored in the MINIAOD data format, along with a signal-enriched skim of events in the RAW data format that will aid the commissioning of the analysis techniques. We will review these activities, as well as future plans for Run 3.

Consider for promotion

Yes

Primary author: BAINBRIDGE, Robert John (Imperial College (GB))

Presenter: BAINBRIDGE, Robert John (Imperial College (GB))

Session Classification: Track 1 –Online and Real-time Computing

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