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Performance of CMS Level-1 Trigger Data Scouting during LHC Run 3

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The CMS Level-1 Trigger Data Scouting (L1DS) defines a new approach within the CMS Level-1 Trigger (L1T), enabling the acquisition and processing of L1T primitives at the 40 MHz bunch-crossing (BX) rate. The L1DS will reach its full potential with the CMS Phase-2 Upgrade at the HL-LHC, harnessing the improved Phase-2 L1T design, featuring tracker and high-granularity calorimeter data for the first time. Since LHC Run 3, an L1DS demonstrator has been gathering muons and calorimeter objects, with ongoing data characterization to validate the system. The objective is to present the initial findings, evaluating performance using SM candles like $Z \rightarrow ee$ or $Z \rightarrow \mu\mu$ and examining object multiplicity and occupancy per BX, as well as bunch-to-bunch correlations. The studies confirm L1DS functionality and its potential for trigger diagnostics, luminosity investigations, and physics searches, enhancing the study of signatures thus far deemed constrained by L1T selections.

Alternate track

1. Computing, AI and Data Handling

I read the instructions above

Yes

Primary author: GIORGETTI, Sabrina (Universita e INFN, Padova (IT))

Presenter: GIORGETTI, Sabrina (Universita e INFN, Padova (IT))

Session Classification: Poster Session 2

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