

Abstract Submitted  
for the APR20 Meeting of  
The American Physical Society

**ECAL trigger performance in Run 2 and improvements for Run 3**

PAMPA GHOSE, Florida State Univ, CMS EXPERIMENT COLLABORATION — The CMS electromagnetic calorimeter (ECAL) is a high resolution crystal calorimeter operating at the CERN LHC. It is responsible for the identification and precise reconstruction of electrons and photons in CMS, which were crucial in the discovery and subsequent characterization of the Higgs boson. It also contributes to the reconstruction of tau leptons, jets, and calorimeter energy sums, which are vital components of many CMS physics analyses. The ECAL trigger system employs fast digital signal processing algorithms to precisely measure the energy and timing information of ECAL energy deposits recorded during LHC collisions. These trigger primitives are transmitted to the Level-1 trigger system at the LHC collision rate of 40 MHz. These energy deposits are then combined with information from other CMS sub-detectors to determine whether the event should trigger the read-out of the data from CMS to permanent storage. This presentation will summarize the ECAL trigger performance achieved during LHC Run 2 (2015-2018). More frequent updates of the ECAL trigger primitives have been required relative to LHC Run 1 (2009-2012), due to the higher luminosities experienced in Run 2, and these will also be described. These updates are needed to account for radiation-induced changes in crystal and photodetector response and to maintain stable trigger rates and efficiencies up to  $|\eta|=3.0$ . Further improvements in the energy and time reconstruction of the CMS ECAL trigger primitives are being explored for LHC Run 3 (2021-23). These are particularly focused on improving the performance at the highest instantaneous luminosities, and in the most forward regions of the calorimeter ( $|\eta|>2.5$ ), where the effects of detector aging will be the greatest. The main features of these improvements will be described, and preliminary estimates of the expected performance gains will be presented.

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Date submitted: 19 Feb 2020

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