Contribution ID: **266** Contribution code: **S05-HEP-200** Type: **Poster presentation**

Upgrade and extensive hardware and software tests of the CMS ECAL detector for the upcoming LS3

Tuesday, 30 August 2022 18:00 (1h 30m)

As part of the Compact Muon Solenoid (CMS) experiment, the Electromagnetic CALorimeter (ECAL) detector control system (DCS) is preparing for major tests and upgrades of both software and hardware for the next long shutdown 3 (LS3). Interlocks of Cooling system, High Voltage (HV) and Low Voltage (LV) by the PLC system will be tested, as well as lowering the temperature at which the detector is currently operating (from 18 ℃ to 9 ℃), as well as the impact of changing the temperature sensor type (our goal is to move from the NTC type to the PT1000 type which is much easier to read and integrate into the Siemens PLC system, and on the other hand has the necessary accuracy and reliability). The existence of a real test system (identical system is currently in operation inside the detector at P5) in one of our laboratories provides a unique opportunity to perform all these tests and many others, in order to improve safety and robustness during the operation and achieve new control features. All these tests and results will help us choose the best hardware and we should be able to understand the limits of the control system and how to overcome them until the next LS3 (foreseen in 2025).

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Session Classification: Poster session

Track Classification: Scientific Sections: S05 High Energy Physics (Particles and Fields)