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Phase1 upgrade of the CMS-HF Calorimeter

In this poster, results of the Phase1 upgrade of the CMS Hadron Calorimeter (HF) will be discussed. The CMS-HF Calorimeter was using regular PMTs. Cherenkov light produced in the fibers embedded in the absorber was read out with the PMTs. However, occasionally stray muons hitting the PMT windows cause Cherenkov radiation in the PMT itself and produce large signals. These large signals mimic a very high-energy particle and are tagged as important by the trigger. To reduce this problem, it was decided to replace the PMTs. The four-anode PMTs that were chosen have thinner windows; thereby reducing the Cherenkov radiation in the PMT window. As part of the upgrade, the read-out electronics is to be replaced so that the PMTs are read out in two channels by connecting each pair of anodes to a single channel. Information provided by these two channels will help us reject the false signals due to the stray muons since the Cherenkov radiation in the PMT window is more likely to produce a signal only in one anode as opposed to a real signal whose light illuminates all four anodes. In this poster, the effect of the thinner windows on reducing the unwanted signals will be shown. Currently, the four-anode PMTs are read out using the old electronic system with all four anodes ganged together. Testing and possible installation of the new read-out system will be mentioned in detail. Some algorithms to be used for rejecting the false signals will also be discussed.

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