Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Precision timing with Silicon Photomultipliers IRENE DUTTA, Caltech, CMS COLLABORATION — The LHC will upgrade its instantaneous luminosity by the year 2025 and produce about 140-200 pileup interactions per bunch crossing within a few centimetres of the beam axis, an increase of a factor of 5 compared to current running conditions. The increased number of tracks and deposits in the calorimeters of the present CMS detector would substantially reduce the efficiency of particle flow reconstruction algorithms, considerably diluting prospects of finding new physics despite the increased luminosity. To mitigate this problem, a new timing layer detector has been proposed with a precision of 30 ps, which can reduce vertex merging in space from 15 % to 1% in space-time [1].This detector not only reduces the effective vertex multiplicity and improves the identification of isolated objects, but also opens up unexplored parameter space for searches for new physics.
After an introduction on the motivation and projected performance benefits of this detector, I will focus on the design of the barrel compartment, consisting of LYSO:Ce crystal tiles coupled to SiPMs (silicon photomultiplier). I will talk about the current precision timing R&D with these tiles at various testbeams held at CERN and FNAL.

[1]CMS-TDR-17-006

Irene Dutta
Caltech

Date submitted: 03 Jan 2018 Electronic form version 1.4