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CMS Run-2 Instrumentation for beam radiation and luminosity measurement using novel detector technologies ALEJANDRO GOMEZ ESPINOSA, Rutgers, The State University of New Jersey, CMS COLLABORATION COLLABORATION — The higher energy and luminosity for Run 2 at the LHC initiated the development of dedicated technologies for beam radiation monitoring and luminosity measurement. A dedicated pixel luminosity detector measures coincidences in several three layer telescopes of silicon pixel detectors to arrive at a luminosity for each colliding LHC bunch pair. The full pixel data is also read out at a lower rate to reconstruct charged particle tracks for monitoring and beam spot determination. The upgraded fast beam conditions monitor measures the particle flux using 24 two pad single crystalline diamond sensors, equipped with a fast front-end ASIC, produced in 130 nm CMOS technology, for excellent time resolution. A new beam-halo monitor exploits Cerenkov light production in fused quartz crystals to provide direction sensitivity and excellent time resolution to separate incoming and outgoing particles. The back-end electronics of the beam monitoring systems include dedicated modules with high bandwidth digitizers developed in both VME and microTCA standards for per bunch beam measurements and gain monitoring. All sub-detectors have been taking data from the first day of LHC operation in April 2015. Detector performance results from the 2015 LHC Run II will be presented.

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