

CMS Pixel Upgrade for the Phase I: Module Production and Qualification

Saturday, 26 September 2015 19:12 (1 minute)

The present CMS pixel detector has been designed to be fully efficient up to luminosity of $1e34 \text{ cm}^{-2} \text{ s}^{-1}$. The instantaneous luminosity of LHC will be raising up to $2e34 \text{ cm}^{-2} \text{ s}^{-1}$ in coming years. Therefore a new detector will be built and installed in the extended year-end technical stop (YETS) in 2016-17. It will consist of four barrel layers and three disks in each endcap (one layer more with respect to the current pixel detector, barrel and disks). Modules for the barrel pixel detector are in production since Spring/Summer 2015 in five different centers. Module production requires first testing components independently and then bump bonding, wire bonding and gluing processes to finally assemble a full module. To have a uniform performance of all modules the standard qualification procedures have been developed. All modules will pass thorough 10 thermal cycles between +17C and -25C and then electrical tests in the temperature and humidity controlled environment at +17C and -20C. In addition, performance of the modules will be verified under high rate X-rays. Internal calibrate signals used for electrical tests will be calibrated in units of electrons using well defined X-ray fluorescence lines from different target materials. The qualification criteria based on which modules are selected to be used in the final system will be explained in details. Finally, the status and challenges of the production are reported.

Primary author: MINANO MOYA, Mercedes (National Taiwan University (TW))

Presenter: MINANO MOYA, Mercedes (National Taiwan University (TW))

Session Classification: After dinner POSTER session, with drinks: (All presenters are requested/encouraged to attend their posters; All participants are requested to participate the session, with drinks!)

Track Classification: Pixels (including CCD's) - Charged particle tracking