

Assembly and Testing of 2S Module Prototypes for CMS Outer Tracker Phase-2 Upgrade

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The High Luminosity LHC (HL-LHC) requires the CMS detector to undergo a major Phase-2 upgrade, which involves the complete replacement of current tracker. The new tracker will be divided into two main parts: inner tracker and outer tracker. The Phase-2 outer tracker will employ two types of silicon modules, 2S and PS, based on a novel pT discrimination concept. These modules aim to reduce local data in the front-end electronics by utilizing the strong magnetic field of the CMS detector, effectively rejecting low transverse momentum (pT) particles.

This talk provides a comprehensive overview of the prototyping process for 2S modules, focusing on the precise assembly techniques and testing procedures employed during the development phase. These procedures play a crucial role in ensuring the performance, functionality, and quality of the 2S modules before their implementation in the outer tracker.

In addition, several test beam performance studies have been conducted on 2S module prototypes, utilizing the electron beam with energies up to 6 GeV at DESY. A comparison between the EUTelescope and Corryvreckan offline data reconstruction frameworks will be presented for the performance study of the 2S module, using the test beam data.

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