Development of pixel modules for the forward region of the ATLAS Phase-II Tracker Upgrade
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Abstract
The assembly and results from testing of pixel modules for the forward regions of the ATLAS Tracker Upgrade are discussed. Sensors have been developed for the ATLAS FE-I4 and new RD53A readout chips. The module assembly process is described. The characterisation of high-speed low mass cables for data transmission are also discussed.

Module Assembly
Mounting of flexible hybrid on bare FE-I4 quad modules
• Require assembly and testing of 10-20 modules/week
• Assembly time about 30mins, allows 10-20 modules to be made over 2 days
• Currently using Araldite 2011, curing time at r.t. 24hrs applied with glue stamp

Data Transmission
Pixel system readout requires high speed multiplexed data transmission capable of handling the high data rates. Development of low mass cables capable of transmitting data at 5.12Gb/s, differential signaling with 100 (or 70Ω impedance) with attenuation less than 20 dB for ≥ 5m at 3.0 GHz, including connectors and Bit-Error Rates < 10⁻¹³, using standard pseudo-random data.

Quad Sensors I-Vs

CP7: Sensor for RD53A characterisation
RD53A chip is the prototype readout chip for ATLAS and CMS pixel systems. A new sensor wafer has been developed to characterise the chip

Summary
• CP6 quad sensors show good yield
• New sensor wafer for characterising RD53A
• Module assembly being developed for production
• Low mass cables for data transmission have been characterised