

Measurements of highly irradiated ATLAS n+-in-n planar pixel sensors

Thursday 1 March 2012 11:35 (25 minutes)

ATLAS plans a full replacement of its inner tracker after the end of this decade to cope with luminosities of up to $10E35$ cm⁻² s⁻¹ at HLLHC. Here, the innermost pixel layer will have to withstand a radiation damage of $2E16$ n_eq cm⁻².

During the last three years lab characterisation of n+-in-n sensors highly irradiated with neutrons and protons as well as several test beam campaigns were conducted, using irradiated and unirradiated readout electronics. Results of these measurements will be presented.

A new dedicated test structure (fanout) for measurements of pixel detectors with exchangeable readout electronics will be introduced and first tests will be shown as well.

Some time ago it was demonstrated on strip sensors that beyond $2E15$ n_eq cm⁻² the conventional models are not sufficient to explain their behaviour. Highly irradiated silicon pixel sensors show clearly similar effects. In order to clarify this matter interesting results could be gained with test beam measurements at very steep angles. First ideas and progress will be presented.

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Session Classification: Planar Detectors