

Full-scale Thermo-mechanical mock-up of the Forward Tracking Disks

Tuesday 31 May 2016 11:00 (30 minutes)

The current generation of solid-state position sensitive devices has better precision, greater integration and less material than previous generations of detectors. Detector solutions have been developed for 50 micron thin, small-pixel sensors with a resolution of a few microns. Ultra-thin sensors require new concepts for mechanical support that maintain good thermo-mechanical performance at a fraction of the material budget traditionally reserved for these services. New ideas for support structures and integrated low mass powering and cooling systems must be characterized thoroughly before finding their way into the experiment.

The talk will address the thermo-mechanical performance of thin self-supporting all-silicon ladders and petals in the LC environment. The effect of a pulsed power supply on the mechanical and thermal stability is evaluated. Two strategies are explored for cooling as the air cooling and micro-channel cooling. The thermo-mechanical properties of dummy sensors are studied, analysed and compared with a finite element simulation. We characterize rapid thermal excursions, vibrations and deformations due to the air cooling and power pulsing. A first mock-up of the Forward Tracker Disks for the ILD detector is presented.

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