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ATLAS pixel endcap upgrade

Tuesday, 24 May 2016 15:00 (30 minutes)

The tracking detector of the ATLAS experiment will be entirely replaced during the Phase-II LHC shutdown in 2024-25, in preparation for high-luminosity LHC running during the following years. Such particle tracking systems must have high stability and low mass, and therefore they make extensive use of carbon-fibre composites with their high stiffness-to-mass ratios and low coefficients of thermal expansion, but accurate FEA simulation of these systems, vital to successful design of a performant system, is highly complex and requires detailed materials properties and appropriate FEA modelling strategies.

An overview of the design of the mechanical support structures and services for the proposed endcap pixel detector will be presented. Measurements of static deformation and vibrational response on prototypes manufactured from M55J/LTM110 pre-preg will be compared to simple models using classical laminate theory. Experimental data on the engineering properties of M55J/LTM110 laminate will be presented along with calculations of the expected structural properties of these prototypes using ANSYS/ACP.

Summary

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