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Prototyping of ‘tilted’ Rings and design of global structures and assembly sequence for the TBPS sub-detector of CMS Tracker Upgrade

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One of the most notable features of the Phase 2 CMS Tracker upgrade is a novel geometry, used in the TBPS sub-detector (Tracker Barrel with Pixel-Strip modules), in which the silicon detector modules are tilted towards the beam interaction point. Compared to traditional barrel/endcap geometries, this tilted concept provides clear advantages in terms of mass and cost saving, but poses unprecedented challenges on the mechanical design, manufacturing and assembly. This talk will present the design and manufacturing procedures of the tilted TBPS Rings as well as the design concept of the global support structure of the TBPS, their calculated mechanical performances, planned assembly sequence and tooling designs. Results obtained with prototypes made in carbon-fibre composites will also be shown.

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