Tracker Geometry

Double and superlayer Strapman

- First example geometry for the FastSimulation (Harry)
  - Replaced TIB0, TOB0 by pixel doublet layers, add pixel doublet layer between BPIX and TIB - Just an example!

- Fastsim rechits shown
- No individual sensor modules simulated, one single module same size as ladder for each ladder
- Passive material not realistic
- next steps:
  - Make digis (and with configurable pixel size which can simulate long pixels or short strips) - Michael Weinberger (Texas A&M) will work on this
  - Enable making strips
  - More testing & debugging
Some Tracker Design ideas (including a schematic of the doublet setup)

- No single strawman tracking system or tracking trigger strategy/design, need comparison studies

**Extra pixel layer, bigger pixels, long pixels/short strips, & 1-2 triggering layers - J. Nash**

**Square pixels, long pixels, super-layers - C. Hill**

**“Minimal Change Approach”**

- just increase/decrease granularity to the minimum needed.

**3 Super-layers of stacked doublets - M. Mannelli**

**“Elliptical” - 60% of the area - G. Hall**

- The next few slides have fancier pics of the stacked doublet layers
Construction of new layers used a previous strawman layout as a reference design.

R-Phi zoom of a stacked pixel layer layout: Consists of an upper and lower ladder with detectors, structural support and ASICs as well as cooling.

3D view of new stacked pixel layer including non-sensitive material and cabling.
Geometry Modifications – Stacked Strip Layer

Instead created 2 TOB Layers closely spaced

R-Phi view of tracker with new stacked strip layer after TOB layer 5
(r=108cm, layer separation=2mm, length=110.8mm)
– sensitive detectors visible

Geometry Modifications – Stacked Strip Layer

R-Phi view of tracker with new stacked strip layer:
Sim Track (50 GeV muon) and siStrip Digis visible

Simulation Test Runs – CMSSW_1_6_0 (Fast Simulation only)

Fast Simulation with digis, ckfTracks reconstruction, trackingParticles and multiTrackValidator – SSLayer at r=110cm

Fast Simulation with gsWithMaterialTracks, trackingParticles and multiTrackValidator – SSLayer at r=110cm

Changes to FastSimulation/TrajectoryManager required
Stub Generation in the Stacked Strip Layer

Began simulating events using modified geometry and assessing performance

Using CMSSW 1.6.0,
- famosSimHits (FastSimulation) + siPixelDigis + siStripDigis, no siStripDigi noise
- Used siStripDigis in stacked strip layer and correlated hits in each stack to obtain high P_t stubs
- A stub is generated if hits lie within +/- 1 strip

10 sensors layers

Stacked 15 sensors layers

... a mixing of the two?