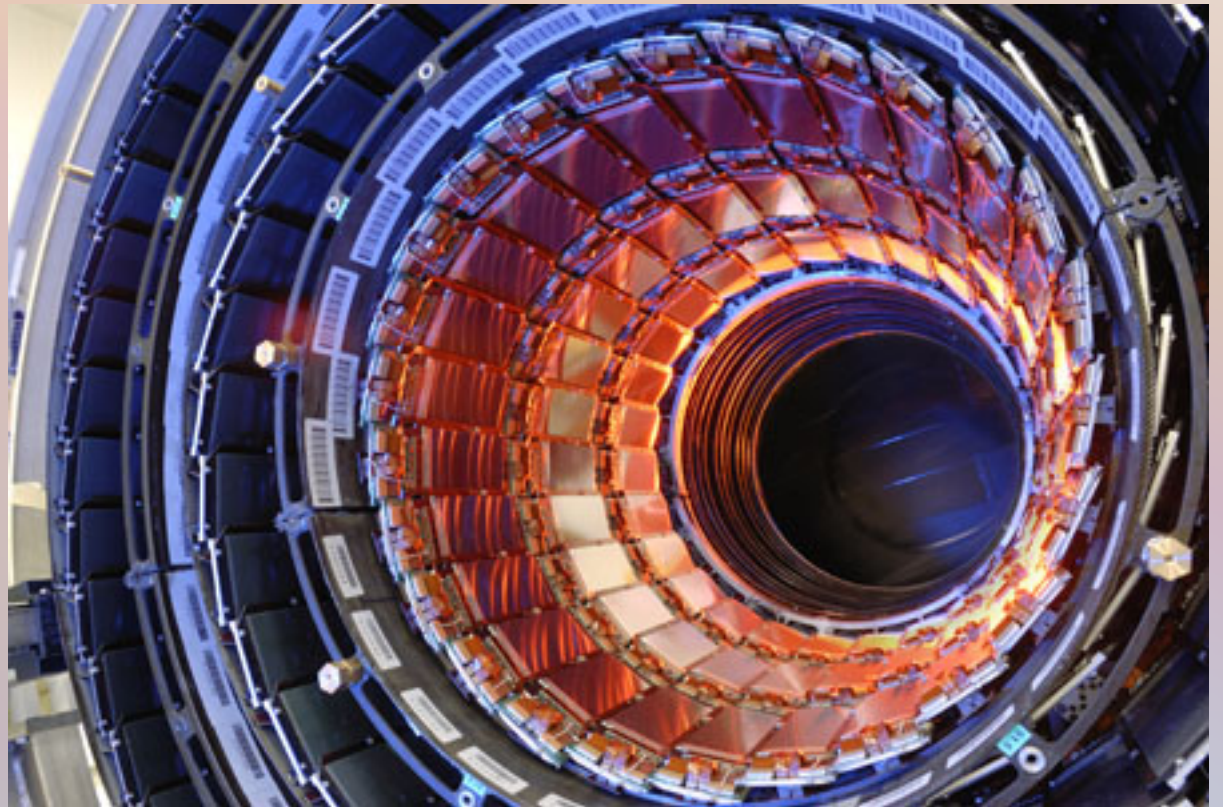


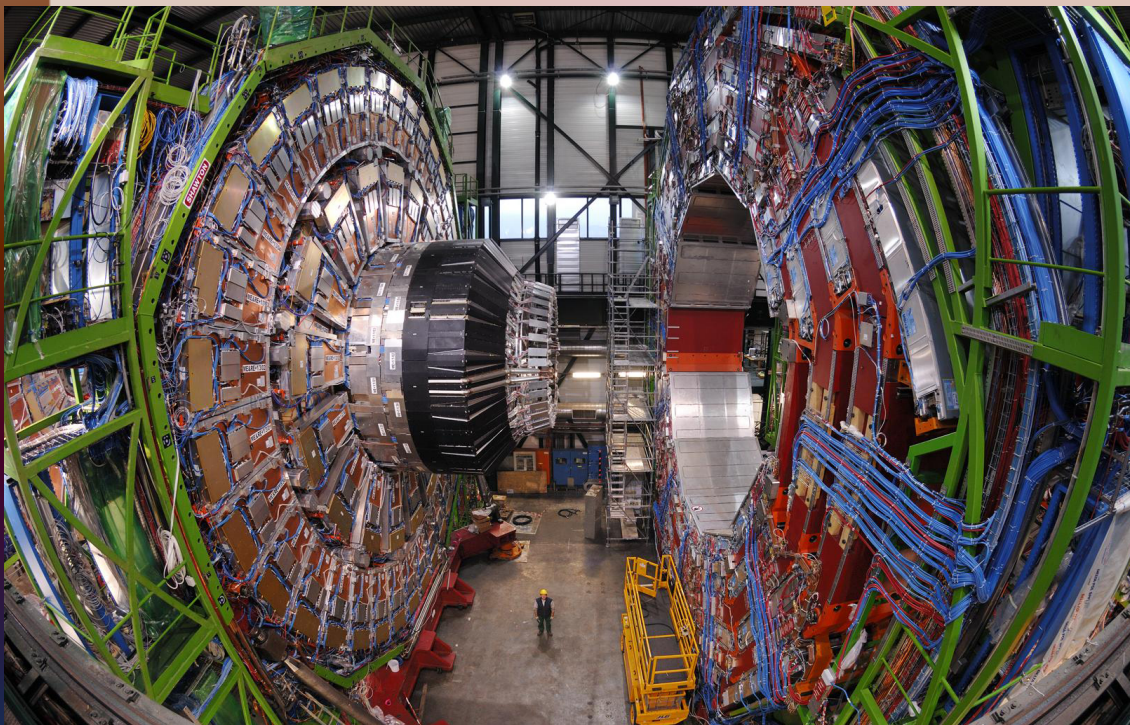
Pile-Up Studies at the CMS Detector

- Russell Smith
- July 7th, 2011



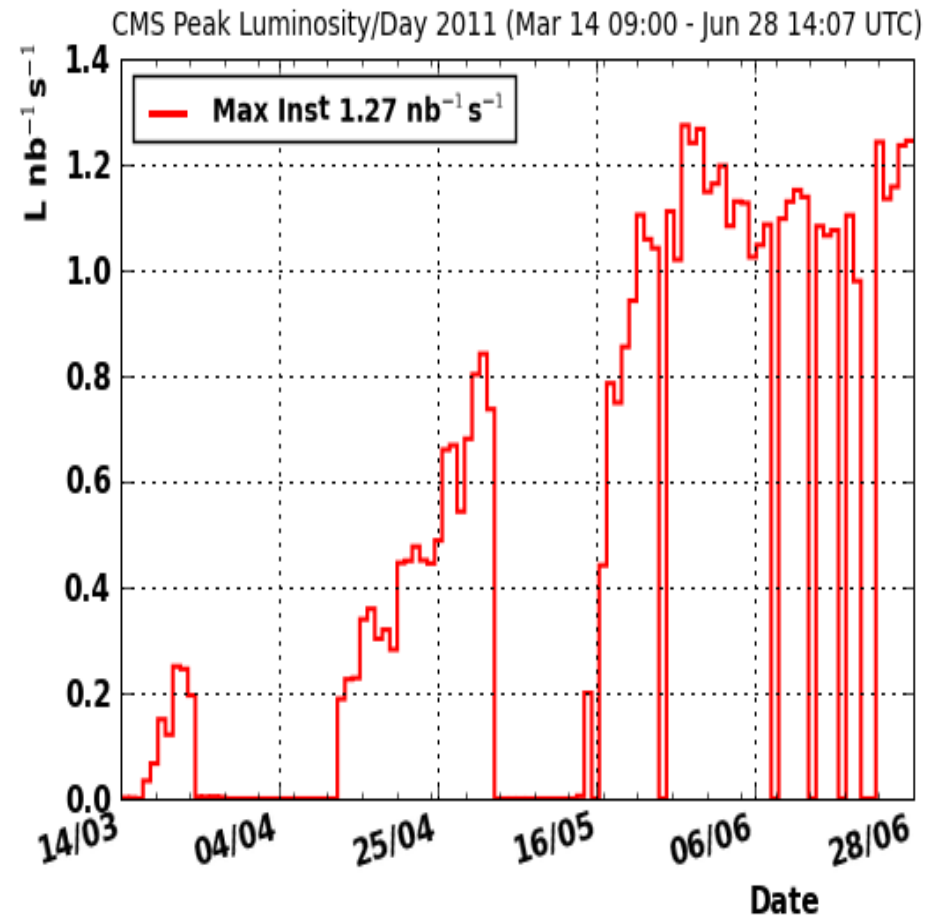
CMS: Compact Muon Solenoid

- 4 T superconducting solenoid
- Largest superconducting magnet ever
- Tracker is my focus
 - Pixels
 - Silicon Strips
- Other components are ECAL, HCAL, and muon system



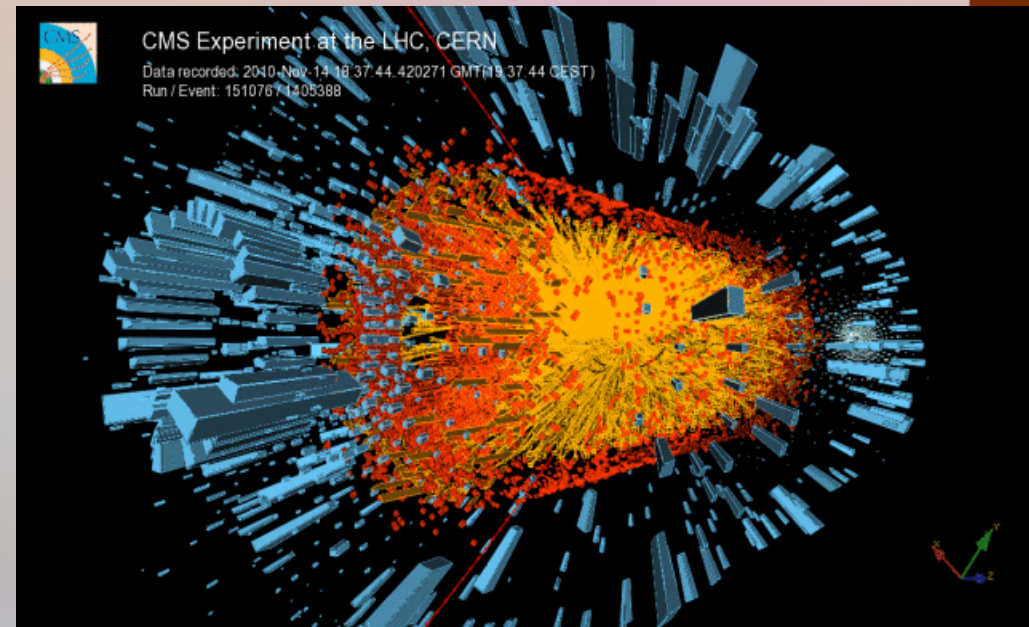
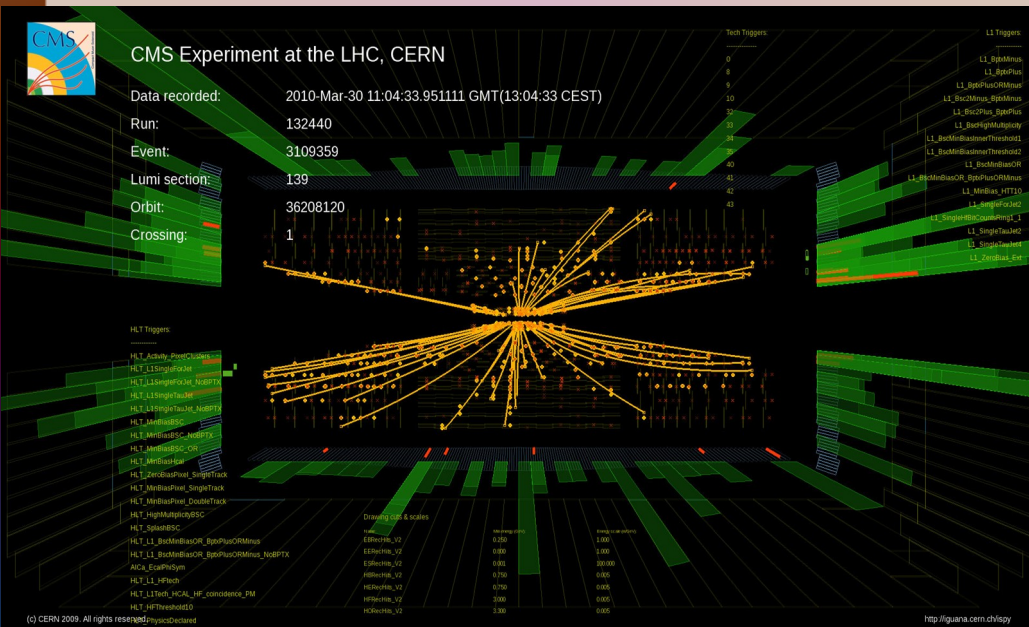
Pile-Up

- Presence of additional proton-proton collisions per bunch crossing
- Need to study effect pile-up on tracking performance
- Two types
 - In-Time Pile-up
 - Out-of-Time Pile-up



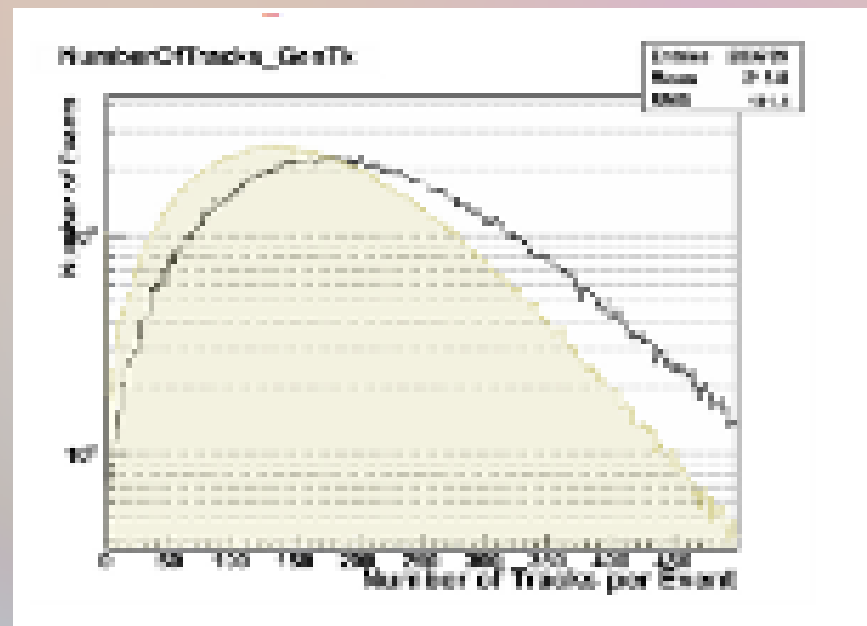
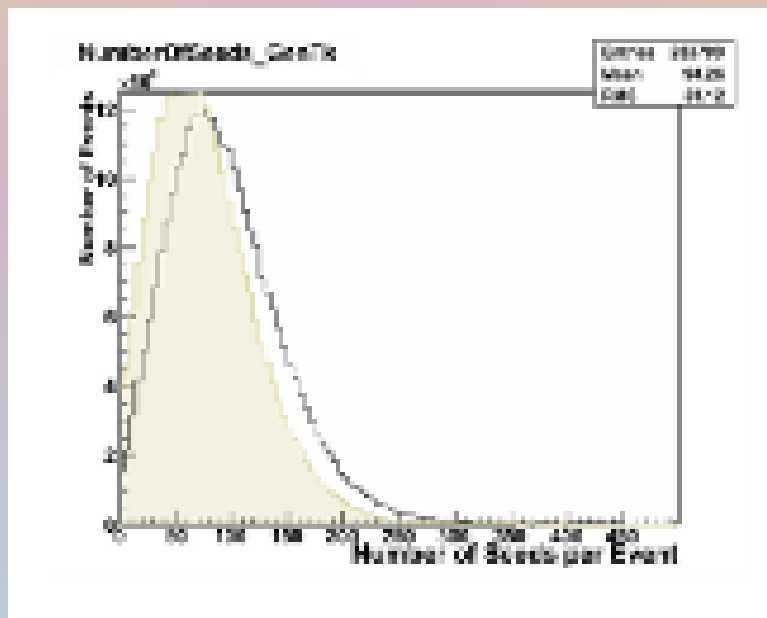
In-Time vs Out-of-Time

- In-Time pile-up are uninteresting collisions occurring in the same bunch crossing as the primary event
- Out-of-Time pile-up is leftover from previous bunch crossing



First Studies: OOTPU

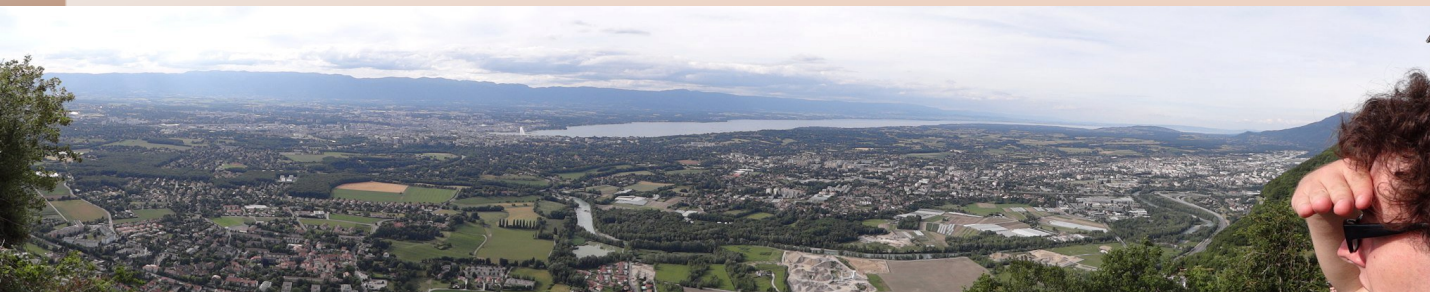
- Compared runs of MinBias data
 - 50ns (open) vs. 75ns bunch crossings (filled)
- Results show what was expected
 - More hits/Event, but same RecHits/Event



Current Work: In-Time PU Studies

- Study pile-up in K-short MinBias data
- Need to study effects on tracking
 - Expect to see some differences based on number of vertices in the event
 - Can have up to 25 vertices
 - Should have differences, but need to investigate

And Fun!



References

CMS Site

- Collaboration
- Public