

# Upgrades for the CMS simulation

David J Lange  
Princeton University  
CHEP 2016

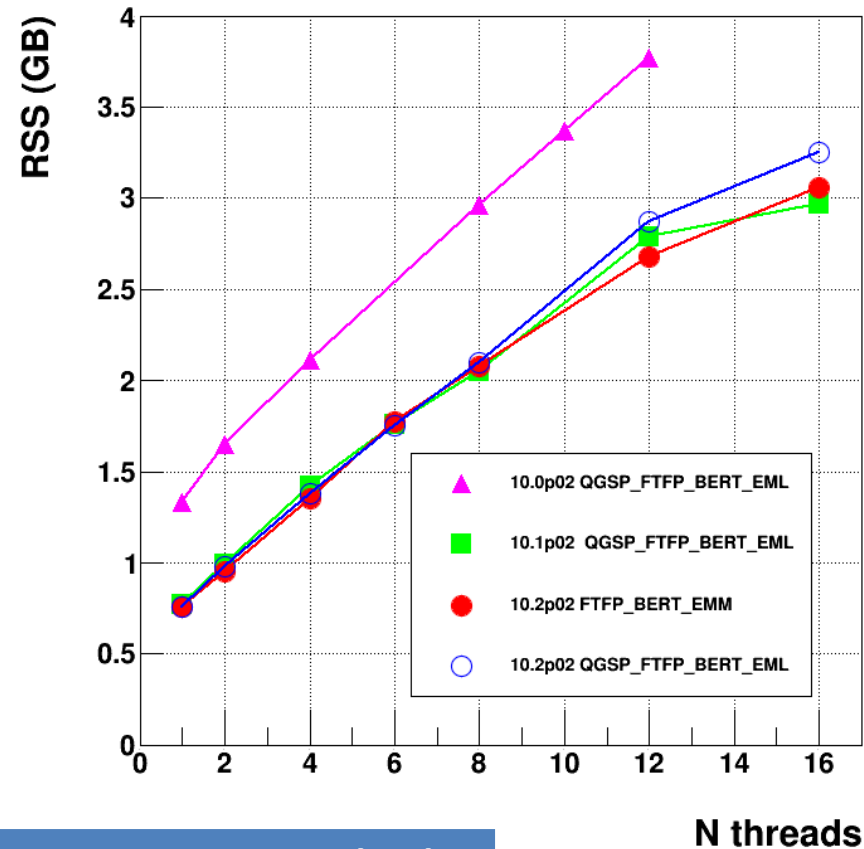


# Memory for CMS run with Geant4

## 10.2p02

- A node with 12 Intel cores was used to study memory utilisation
- 13 TeV hard scattering event were simulated
  - Results after 1000 events are shown
  - CMS private patches to 10.0 include backports of fixes of memory leak and memory optimisation
  - Results for 10.1 and 10.2 are practically the same
  - No dependency on Physics List
- No problems to run CMS SIM production in the MT mode

Memory for ttbar events



Release	1st thread (GB)	Delta per thread (GB)
10.0p02+CMS patches	1.33	0.23
10.2p02	0.76	0.19

# Premixing lessons learned

- After a long development and validation process, **premixing deployed in CMS MC production** since this summer
- Issues and benefits we found
  - Extended “raw” format extended to ensure **sufficient precision** for closeby interactions
  - **Event reuse**: We now potentially re-use entire pileup events instead just individual minimum bias events in Monte Carlo production
  - **Flexibility** considerations: Generating multiple pileup configurations is now more time consuming
  - **Major CPU savings**: At current pileup, our digitization+reconstruction processing runs  $\sim 2x$  faster (with a one time cost of the up front production of the premixed library)

Premixing has brought a substantial operational improvement to our operations!