Simulation Issues for Top

- The precision of all our measurements is limited by the simulation… !

Systematics

- An excellent simulation (generators aside) is a necessary condition for studying (and reducing) systematic uncertainties
  - Bites us at all levels:
    - Acceptances & limits
    - Tails of distributions (i.e. MET in DY)
    - "Scale factors" galore
    - Id (isolation)
    - Etc.

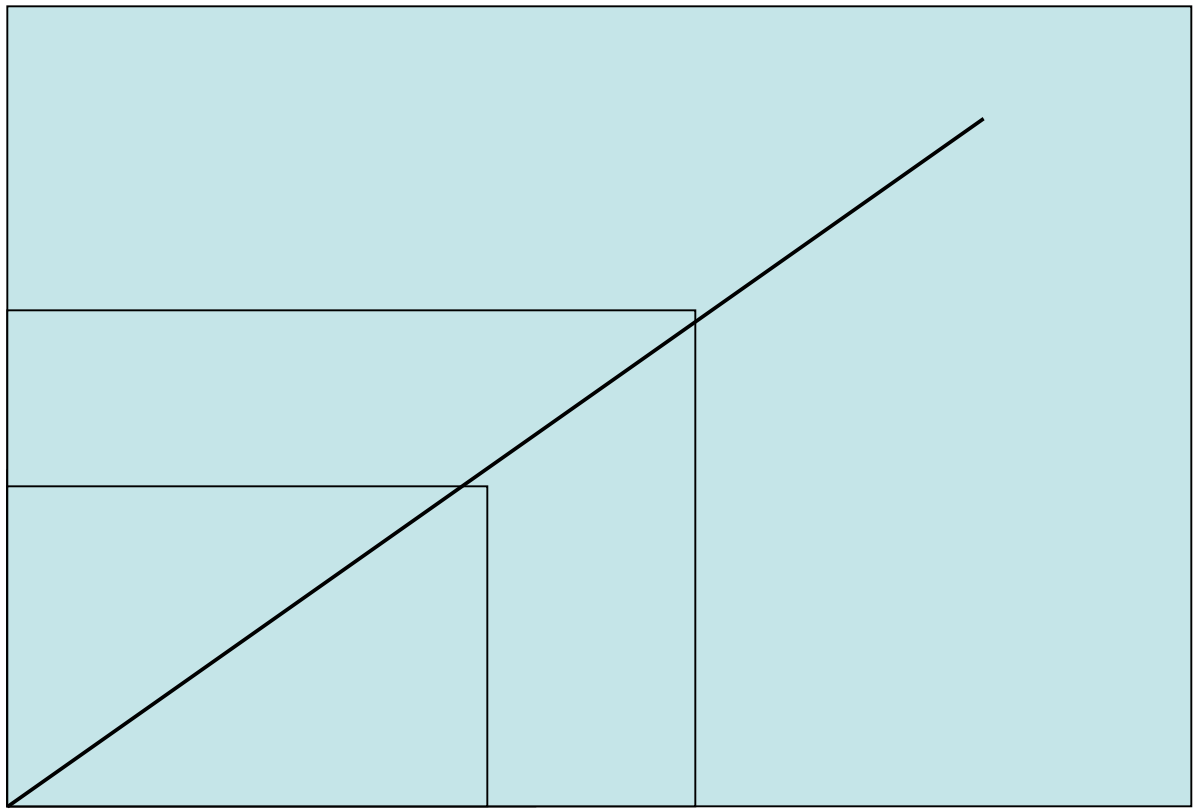
Mass, for example…

- Goal for jet relative response:

  Simulation ≡ Data ⇒ control of:

  - Geometry of calorimeters
  - Single particle response (hadrons, em particles, e/p, non-linearities etc.)
  - Material - all material ! -
  - Geant --> Geisha
  - Min bias [low level radiation response] mult. Int.

Delta M_top



Delta Rel(Data-Sim)

Another example: B-tagging

- Silicon simulation "perfect" or else:
  - Scale factors with large uncertainties (10-15% right now)
  - How do we go to the few % level?
    - Alignments
    - Charge dep.
    - Hit resolutions (also COT tracking resolution)
    - Readout error
    - Different configuration options - make easy to study

And another: collision region/triggers

- Trigsim as a useful tool
  - Trigger efficiency dependences in data to be modeled correctly in sim.
    - High pt e and mu: eta/phi , isolation, dependence
    - All-hadronic SUMET trigger: model kinematic biases
  - {x,y,z} vs. time --> DB --> Sim.

Cont.

- Not news but
  1. Who exactly works on it [responsible] and when?
  2. How do we know it is right [or at least it's status] at any given moment?

Who/ How

- Who exactly works on it? [responsible] and when?
  - Sim + physics groups… hmmm
    - Need to get into a positive feedback loop
      - Fast feedback, both ways, task forces
    - Need detector experts, per detector, in the sim. Group
      - The only successes, am I right?, are when this is the case

transparency

- How do we know it's right at any given moment [and keep it right?]
  - Figures of merit, per release, agreed upon by the sim & detector & physics groups
    - Are the tau-id variables in sim. 5.10.n ok?
    - Two clicks away on the web