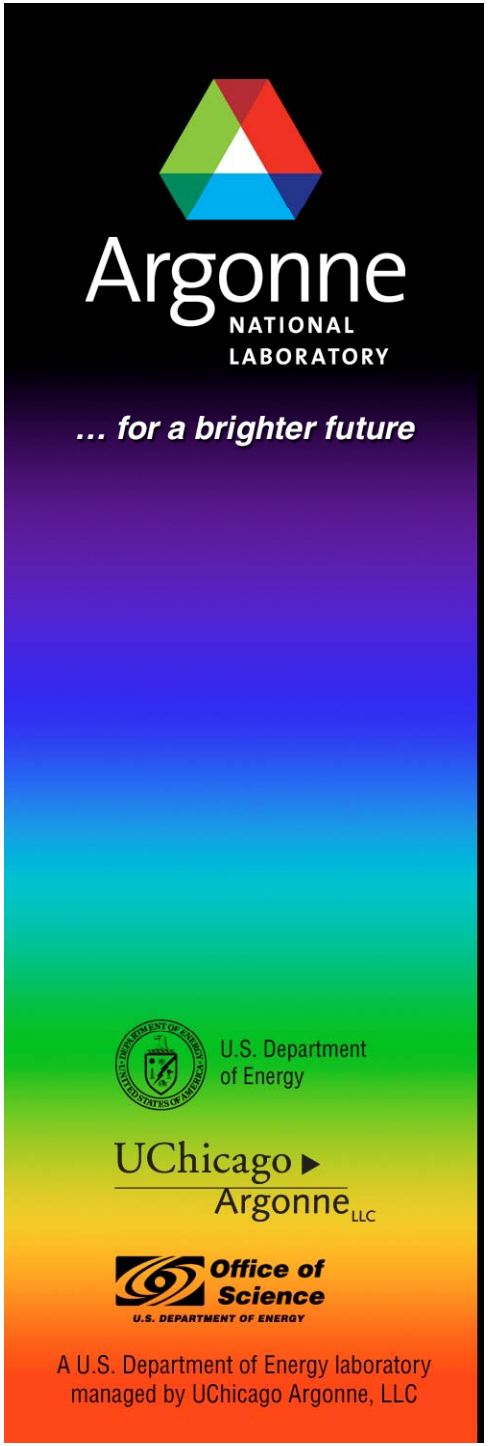

Preparing for First Physics

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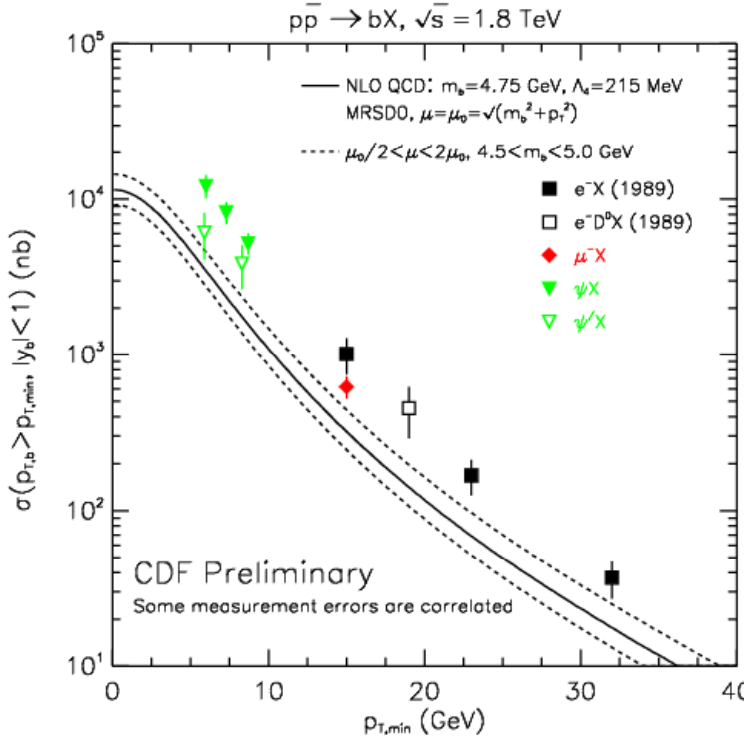
Before We Begin

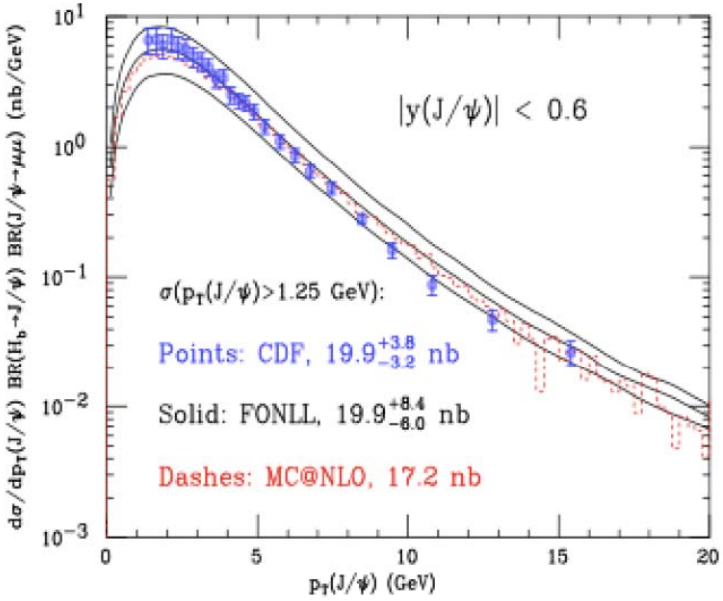
- Dave gave a similar talk last year
  - I could have shown his slides with all the times incremented by +1 year
  - I sincerely hope that Leandro won't be able to say the same thing next year!

- I am going to start with a commercial

The Commercial:

- In 1992, I was a new postdoc on CDF, deciding what to work on.
- I decided to work on understanding the b-quark cross-section and why it's a factor two above theory.





The story has a happy ending: it took a decade and several measurements, but this is now understood.

Why Am I Telling You This?

- A Few Lessons I Learned
  - CDF focused on single high p_T electrons and muons.
    - *I felt this was important, but it wasn't the top quark.*
  - Triggering was vital
    - *I spent most of my time worrying about another trigger entirely (the single high p_T muon trigger). Bad triggers drive out good.*
    - *We made a mistake in the trigger that ultimately provided the key piece of data.*
      - We focused too much on global S/B, and not enough on specific kinematics (where we needed the events)
      - We didn't consider how much data we needed, and whether we could get it from a low lumi menu
- The key idea:
  - If I wanted to get this measurement done, I needed to devote a good deal of effort to things that weren't part of this measurement.

Machine Schedule:

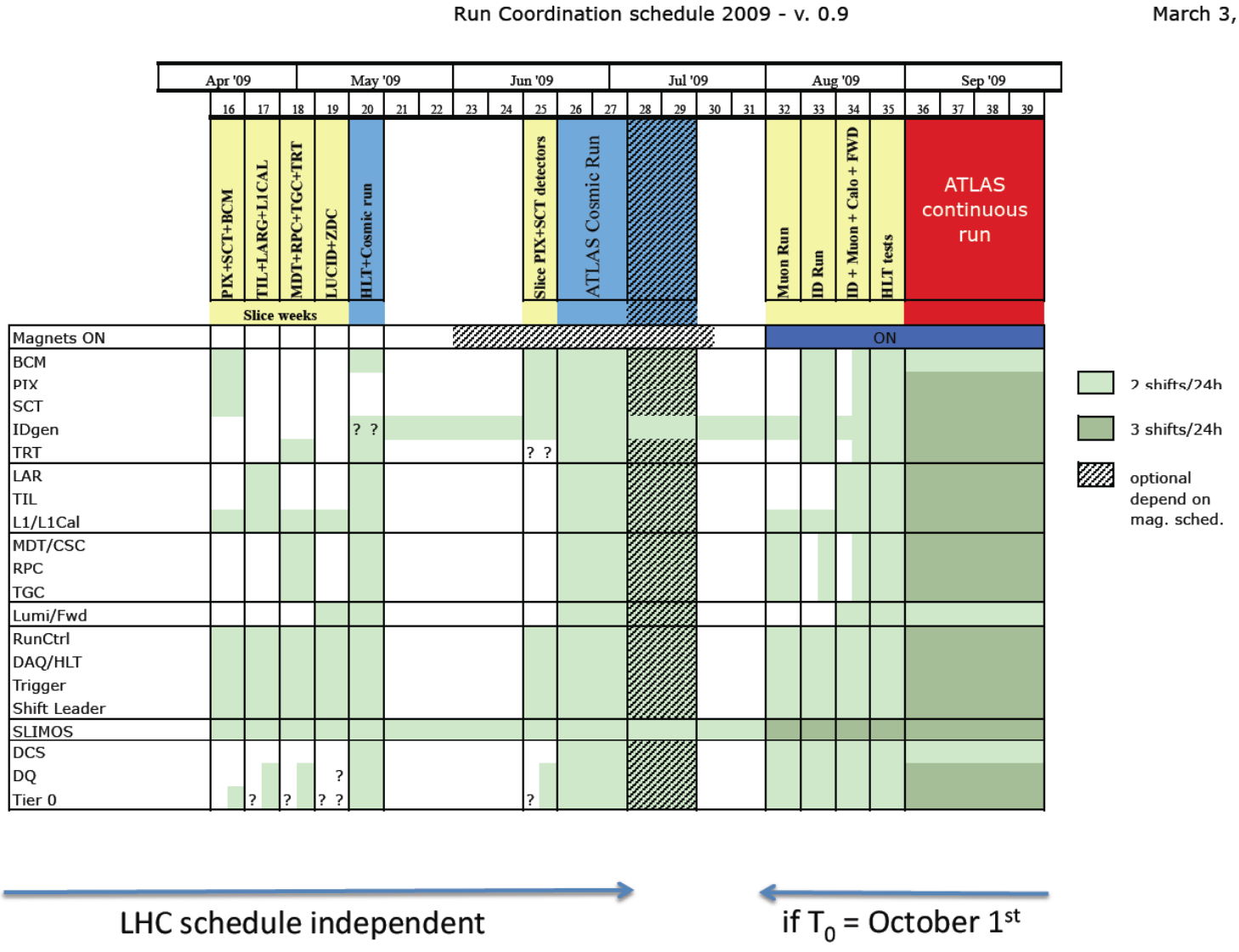
This was circulated a few weeks ago:

Integrated data		**2009**			**2010**											
	units	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mode	#/ns	SU	43	156	SD	SU	156	156	50	50	50	50	25	25	SD	SD
Availability	%	50	50	50	0	50	60	60	60	60	80	80	80	80	0	0
Efficiency	%	0	20	20	0	0	40	40	40	40	40	40	40	40	0	0
Collisions	1e6 secs	0	0.25	0.25	0	0	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0	0
Collisions	**1e6 secs**	**0.5**			**5.6**											

- This table was not designed for a wide distribution, but was an answer to a request of some of the computing people to help plan their capacity

- I'm showing this now to warn people not to read too much into it:
  - The shutdown/startup periods do not accurately reflect today's planning
  - There is no statement about instantaneous/integrated luminosity
    - *Matching these numbers to 200 pb^{-1} requires many assumptions*

ATLAS Run Coordination Schedule



Some Schedule Observations

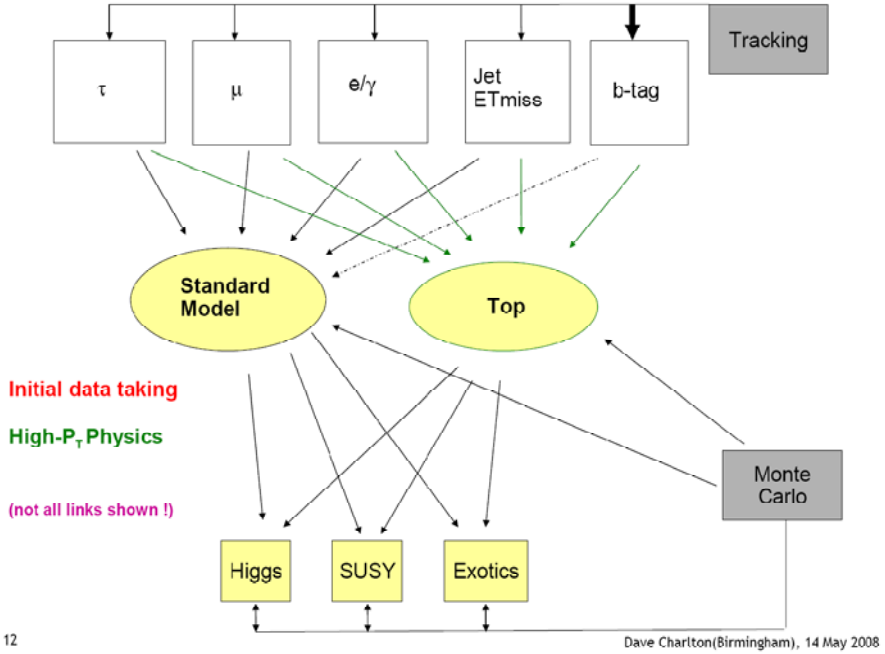
- An October start looks plausible
  - Dates oscillate by +/- a week or two (but oscillate around October, rather than drifting later)
  - Schedule discussions now seem to revolve around welding rather than magnet repair

- We have no idea how quickly the luminosity will grow
  - It's a new machine, with different issues than previous ones
    - *The Tevatron luminosity was driven by antiprotons*
    - *The LHC may well be driven by our comfort with the amount of stored energy in the machine. Particularly post Sector 3-4 incident*

- It's possible that the operating conditions (bunch spacing, pileup, etc.) will change quickly
  - We need to be able to react quickly to these changes

Groups and Subgroups

Dave showed this figure last year.



- In many cases, things have improved
  - More effort in Combined Performance
  - Clearer picture of what's needed for the first analyses
  - Better communication between groups looking at common signatures for different physics processes. (e.g. W+jets, $\gamma\gamma$)

- It's still not ideal
  - Still are some people worrying about 100 fb^{-1} 14 TeV analyses
  - We'll see 100 pb^{-1} at 10 TeV before we see 100 fb^{-1} at 14 TeV

Note that the τ physics program requires every subsystem to be working well.

Analysis Model Confusion

- There is a great deal of confusion about how we intend to do our first analyses – in part because we have a bewildering array of data formats and frameworks.
- The TOB is about to take some steps to clarify this:
  - Not just what *should* work,
  - But what actually *does* work
- Some useful interim advice:
  - D^nPD was an unfortunate terminology, as it makes it appear that one must go from D^1PD to D^3PD via D^2PD.
  - AODs probably won't make much sense until the first reprocessing
    - *In fact, this probably defines when the first reprocessing will occur*
  - Avoiding Athena is probably a mistake
    - *Anything else probably limits the data sets you have access to – especially early on.*

No FDR-3?

- Instead of a monolithic FDR-3, we feel it is better to build on FDR-2

- More focused tests, with increasing user participation
  - Test components that FDR-2 didn't or couldn't test
  - Test components that worked less well during FDR-2
  - One success: the top + background (Wjets/diboson) mixing exercise

- Minimizing distractions is important
  - Turn-on is closer than it looks
  - Most everybody is working hard to be ready
  - We don't want to be making work for people

- A key component will be tests of the Tier 2's
  - That's where the analysis horsepower is, especially once reprocessing starts

Tier 2 Test Phases

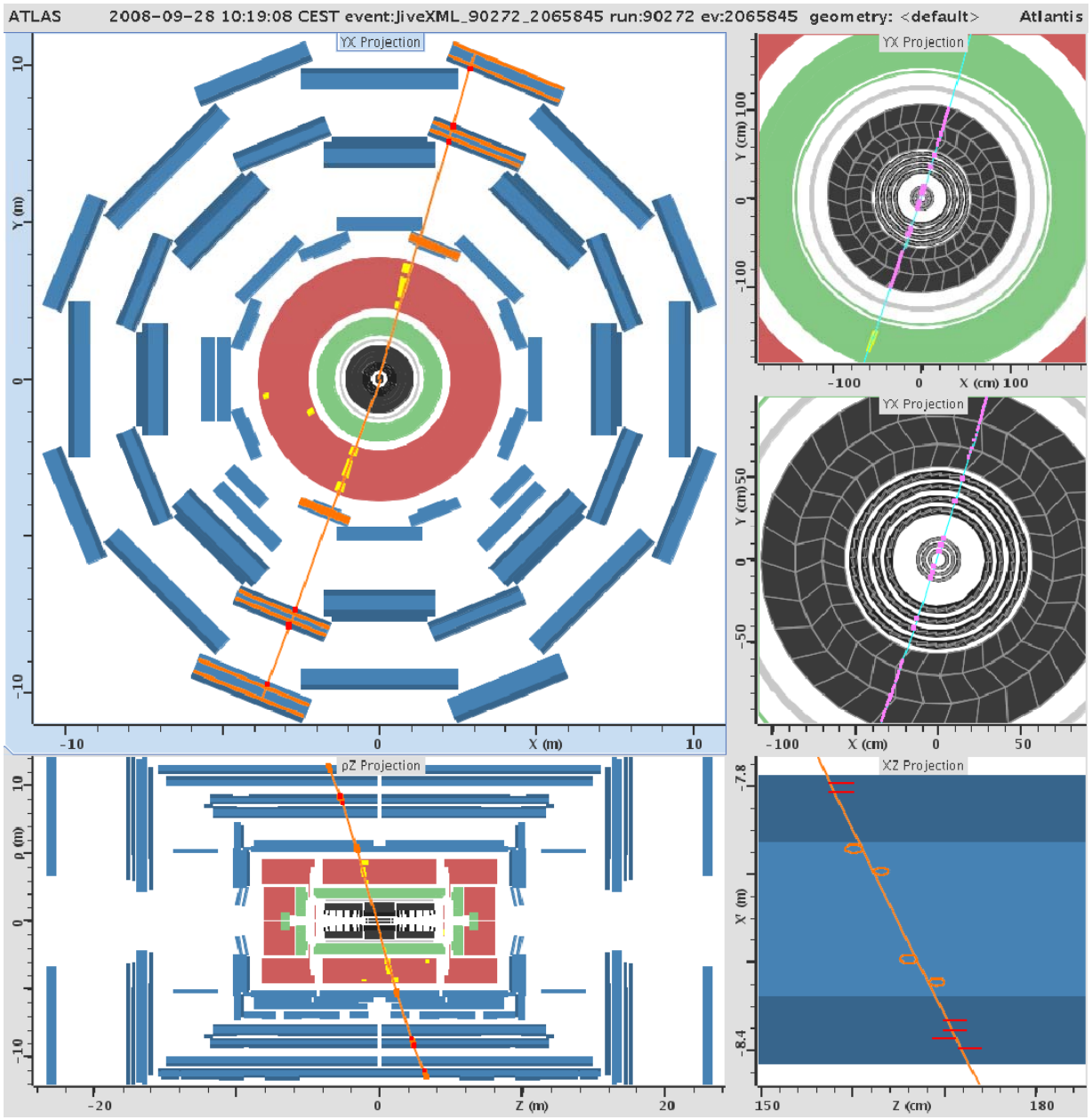
Work started long before we gave it a name.

- Technical test (HammerCloud)
- Phase A:
  - Extend HammerCloud to include a suite of analysis jobs
- Phase B:
  - We have identified heavy users of the grid, world-wide
  - We will be asking ~10 of them to submit their jobs to specific Tier 2's on specified days
  - We will start by learning where the jobs won't run at all
    - *We expect to uncover misconfigurations*
- Phase C:
  - Once the jobs run, we will ask them to submit multiple copies to specific Tier 2's on specified days
- Phase D:
  - We will gradually open this to more and more users – perhaps doubling every week
  - Tier 2 group disk space will be exercised here

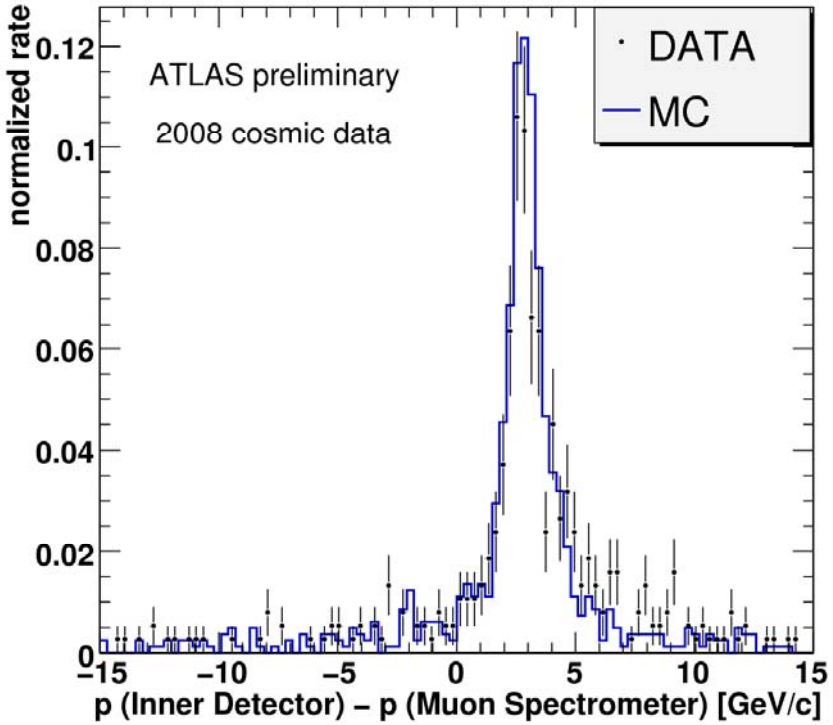
Continuing with concurrent activities, e.g. reprocessing, cosmic ray analysis, etc.

Cosmic Rays

- We have taken >200 million events of real ATLAS data
  - In many ways, this is far closer to collision data than Monte Carlo
- Only a small fraction has been analyzed in detail.
- Tau identification is but one small piece of this.



Cosmic Rays II



- This is indicative of ATLAS' status today:
  - we can see that typically a cosmic ray muon loses a few GeV in the calorimeters.
- This is just a start, however
  - How well does this match the expected energy loss in the calorimeter?
    - *Remember, we know – or should know – the path length*
  - How well does this match the energy deposited in the calorimeter?

Having the calorimeter and tracker working together – and being able to demonstrate that – is critical for τ physics. Looking for τ candidates in cosmic rays is just one piece of what should be the τ cosmic ray program.

Final Thoughts in Lieu of Conclusions

- Working on taus is clearly important
  - Experience has taught us lepton identification pays off
  - We don't understand flavor physics, other than to know that the 3rd generation is somehow special

- There is no ATLAS τ program without ATLAS
  - It may be that the best service one can do to the tau program is to make sure ATLAS *as a whole* works as well as possible.
  - That may mean expanding one's view of what working on taus means:
    - *Is there enough trigger bandwidth left for taus?*
      - Remember, bad triggers drive out good.
    - *Is the detector ready for tau identification?*
      - All subsystems have to be at their best first
    - *Is the computing environment ready for the challenge ahead*
    - *These are just a handful of examples.*

I'd like to encourage everyone here to adopt a very broad view about what "working on τ's" means.

There are many opportunities to help the ATLAS τ program by helping ATLAS as a whole.