

Jets in Particle Colliders

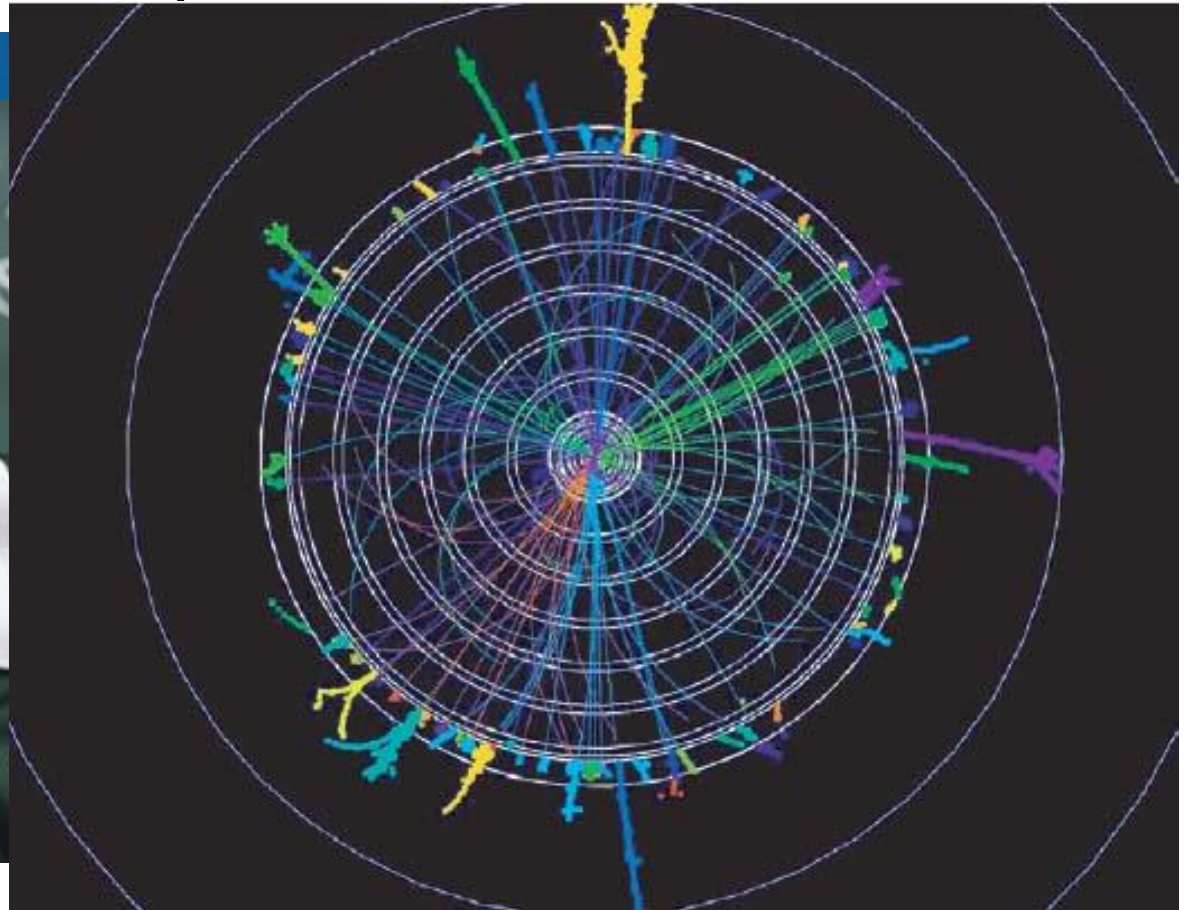
Andrew Wong!

Topics

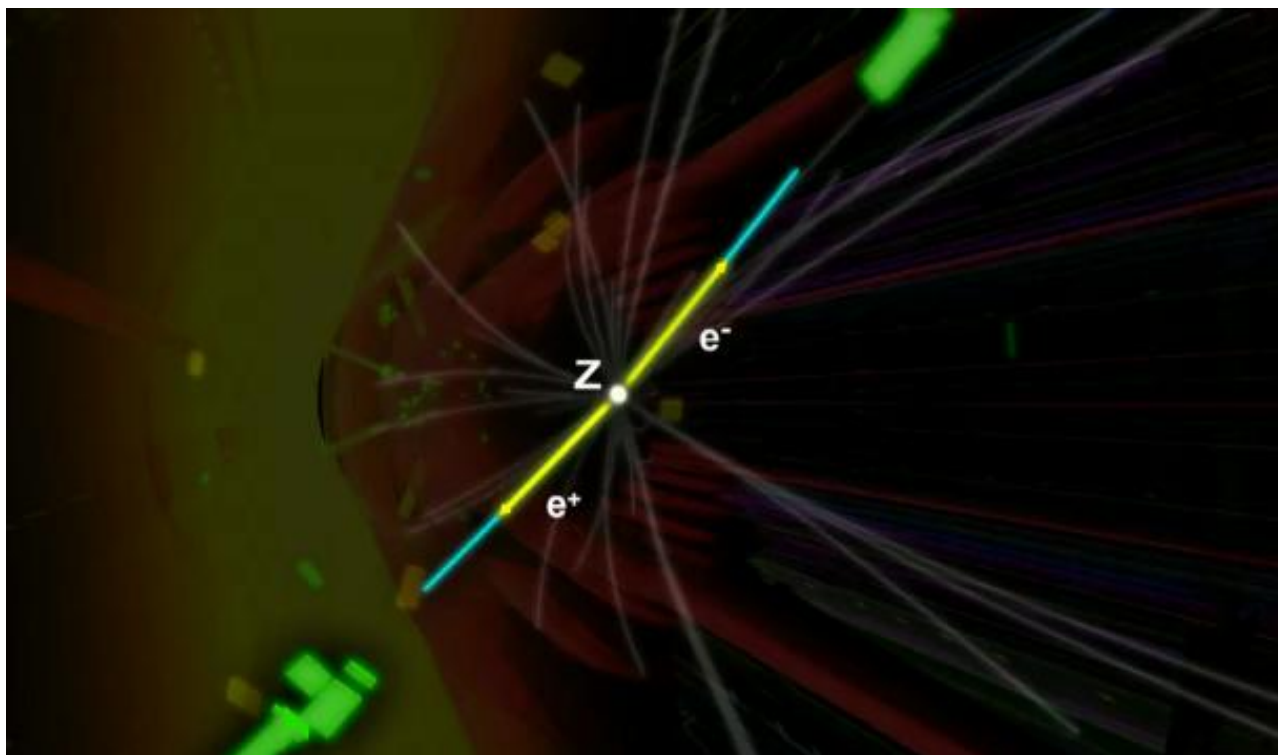
- What are jets?
- How are they produced?
- What do we use to study jets?

What are jets?

- Bunch of different jets



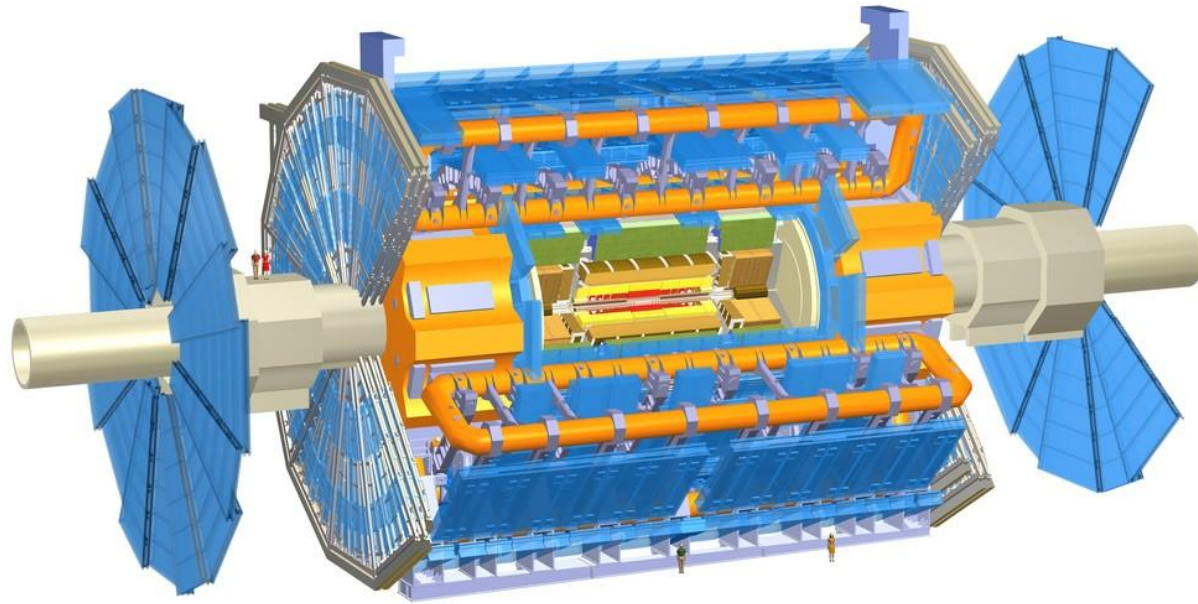
Pretty picture!



What's in a jet?

- Hadrons
 - Kaons, Pions, Protons, Neutrons
- Leptons
 - Mainly electrons and muons
- These have long decay lifetimes

How to cope with the horror

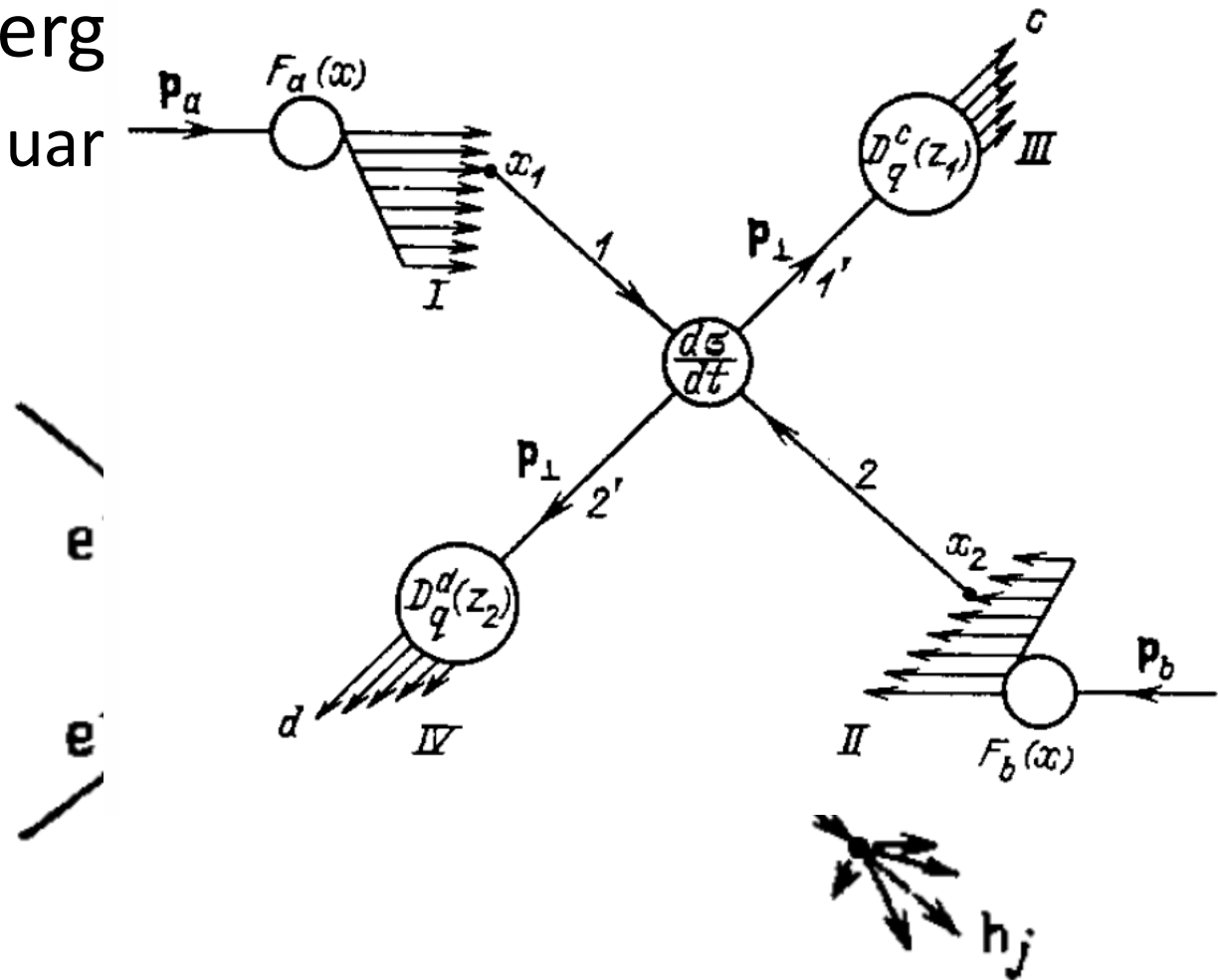


Parts of ATLAS

- Inner Detector
 - Pixel Detector, SCT(Semiconductor Tracker), TRT(Transition Radiation Tracker)
- Calorimeter System
 - EM Calorimeter and Hadron Calorimeter
- Muon System
 - Well... Tracks muons..

How are they made?

- High energy
- Free quarks



Why study them?

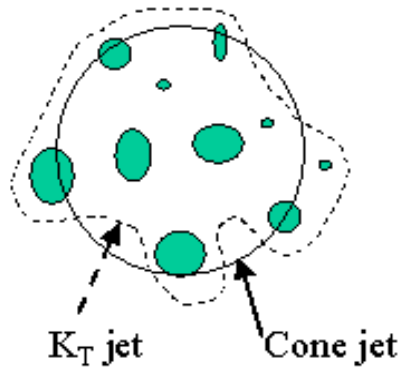
- At the vertex of a jet, is usually the center of the collision
- This is a big point of interest because this is where the new particles are made and this is what we want to study!

Study them?

- Two methods that I know of
- K_t algorithms
- Flavor tagging

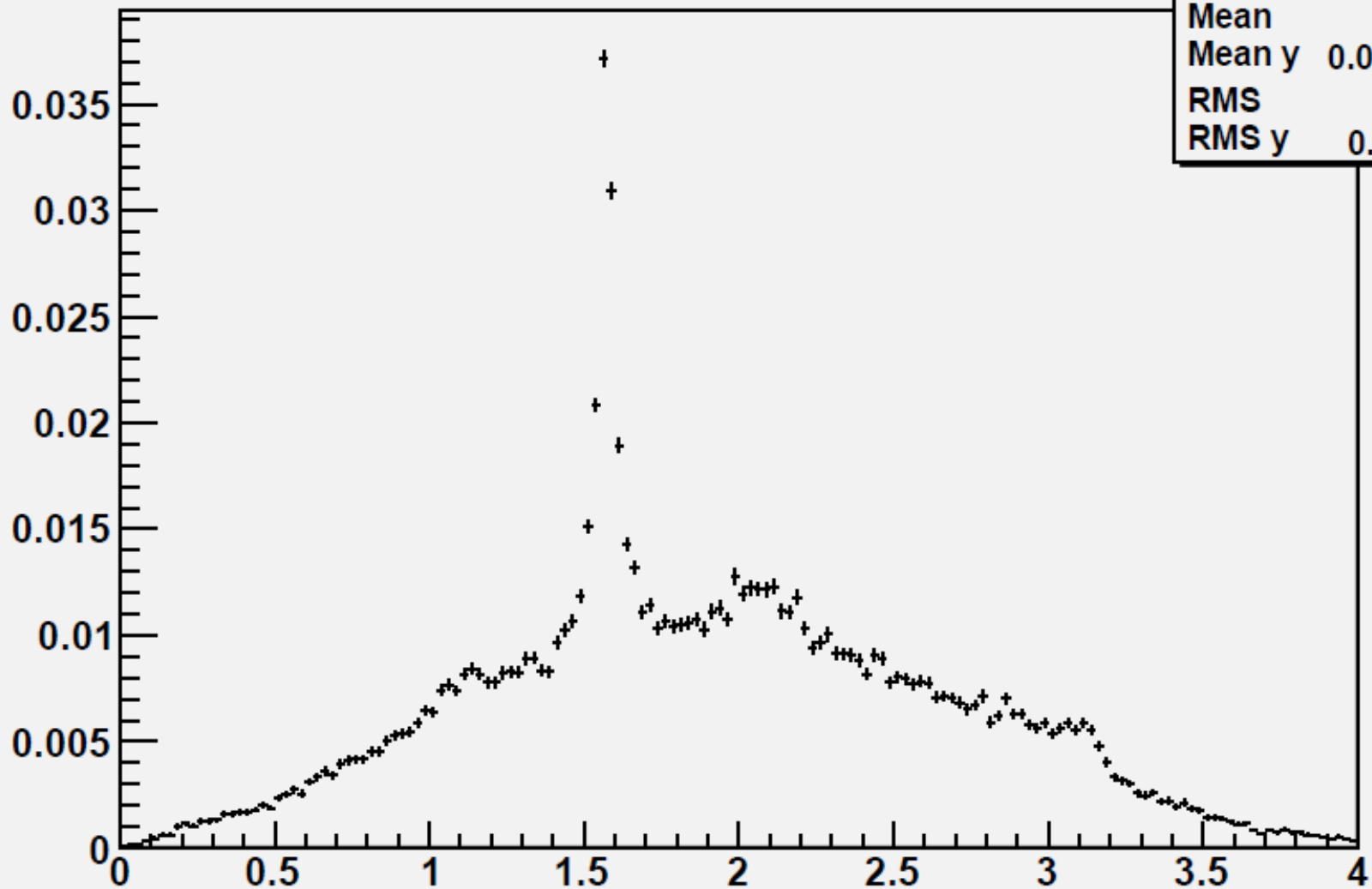
K_t Algorithm

Does it fit in the parameters? If so put it in!



psi 100 to 200 GeV

psi_100_200	
Entries	3014720
Mean	1.988
Mean y	0.006233
RMS	1.155
RMS y	0.03132



B tagging

- b quark hadrons have long enough life time to move a little before decaying
- b quark is a lot larger than anything it decays into
 - Lots of transverse momentum, so it makes the jet a bit wider than they normally are

Conclusion

- Jets come about from free quarks in high energy situations
- We use detectors to take data of these jets
- We have many different algorithms to do jet reconstruction so we can study the vertex