Muons Scattering Through Large Angles at CalDet

Leo Jenner

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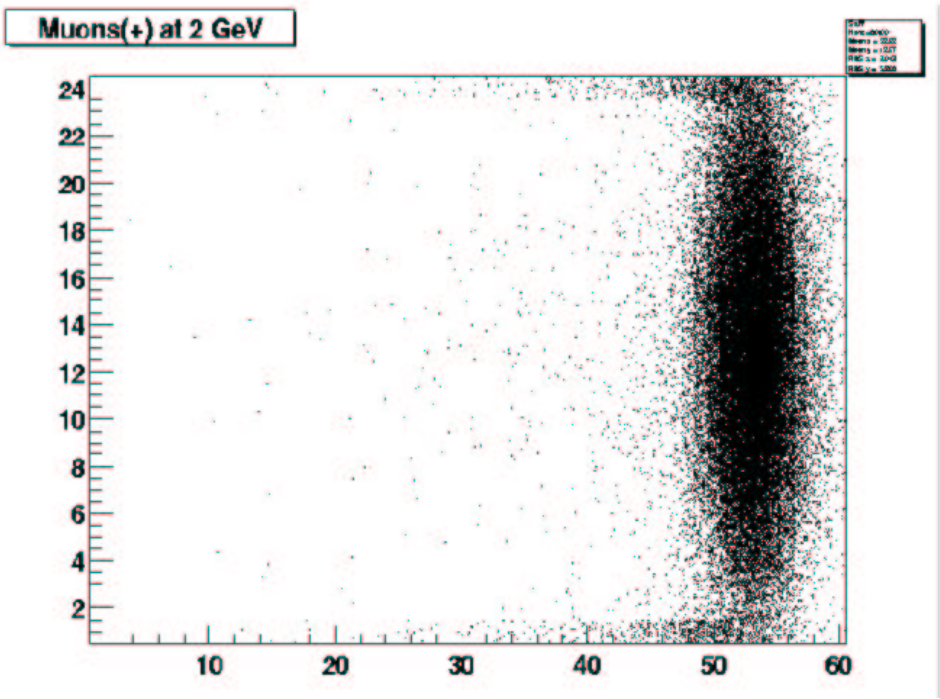
University College London

Overview

- **Large Angles:** Some high energy muons scatter and leave the side of the detector
- **Monte Carlo:** Muons generated to see effect
- **Real Data:** Problems
- **Next...**

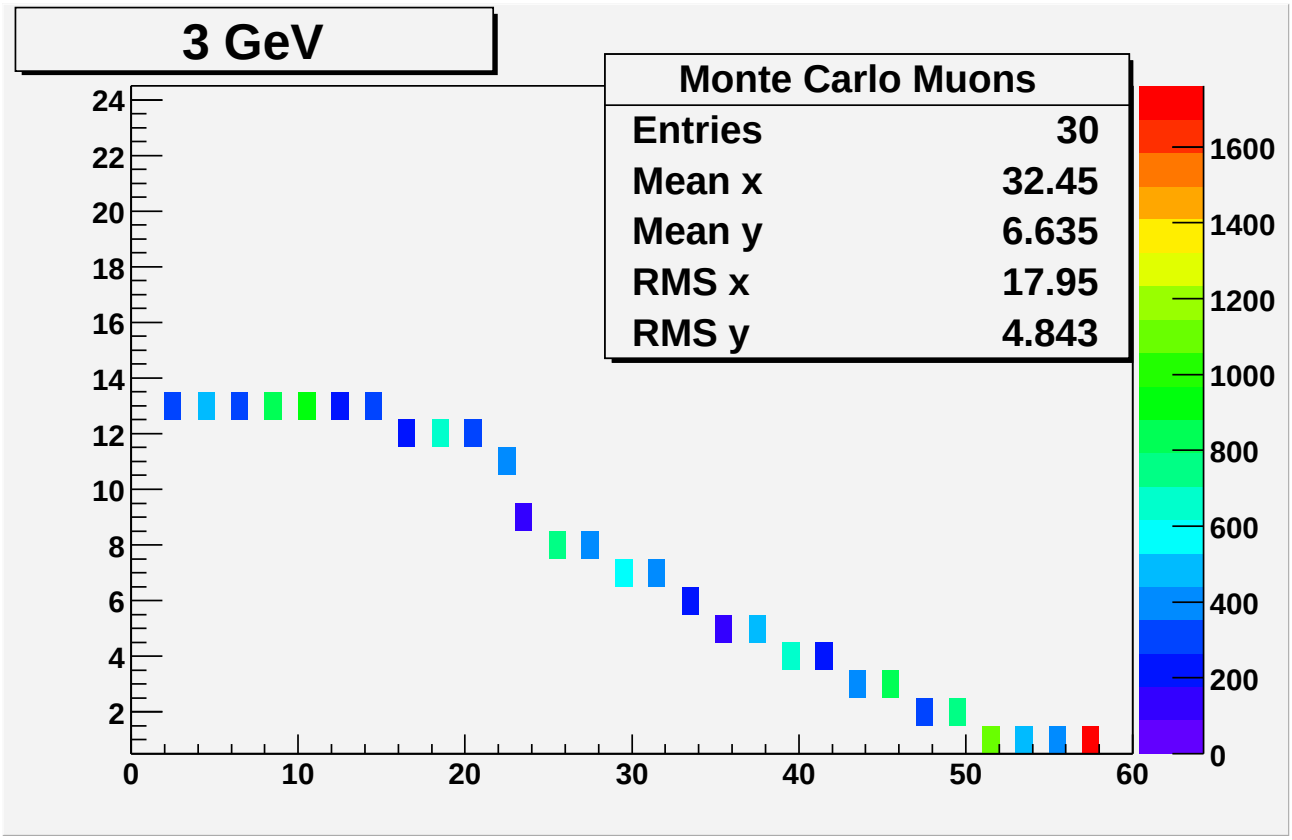
Large Angles

- It has been proposed that muons scatter through high angles in the CalDet more often in Monte Carlo simulation than is seen in the data
- This comparison is an indication of whether our Monte Carlo scattering model is accurate or not



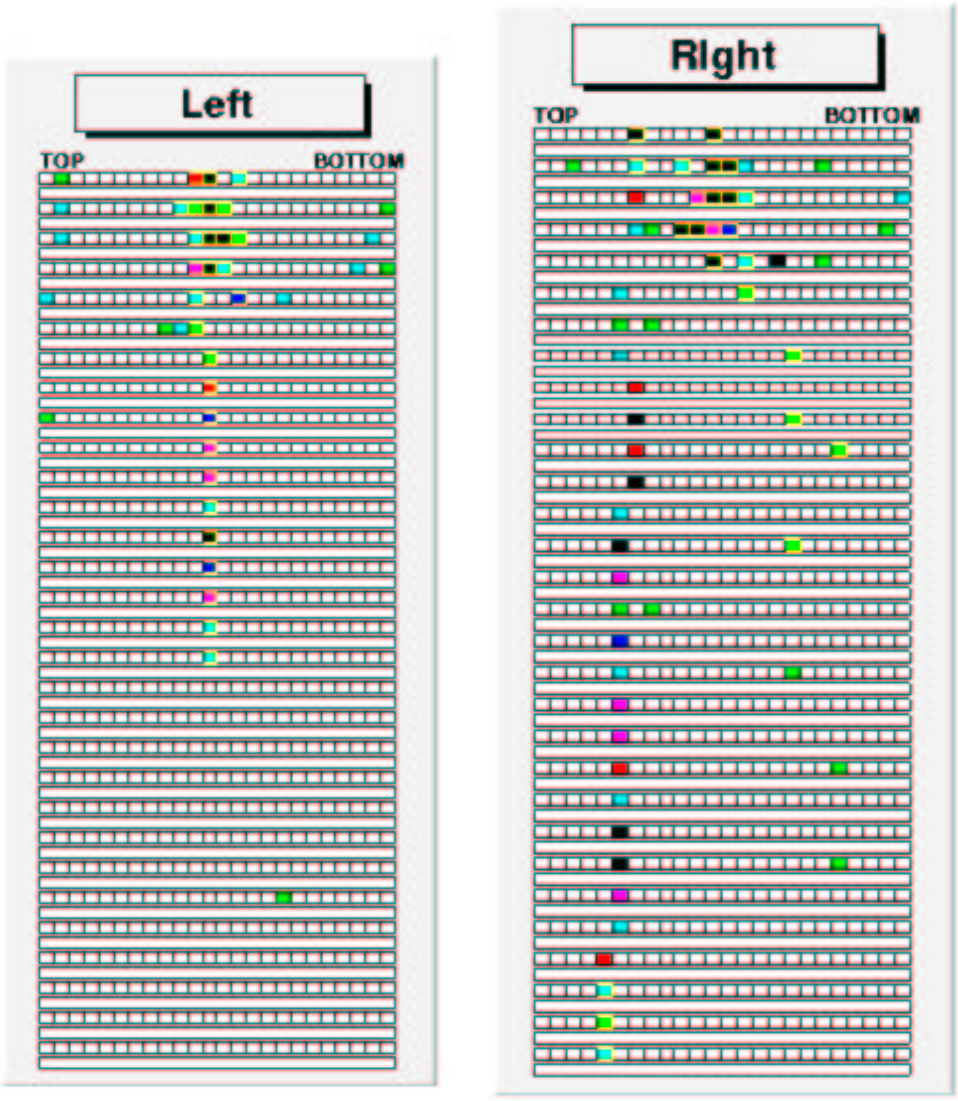
- At 2 GeV, mean lph is 54

Monte Carlo



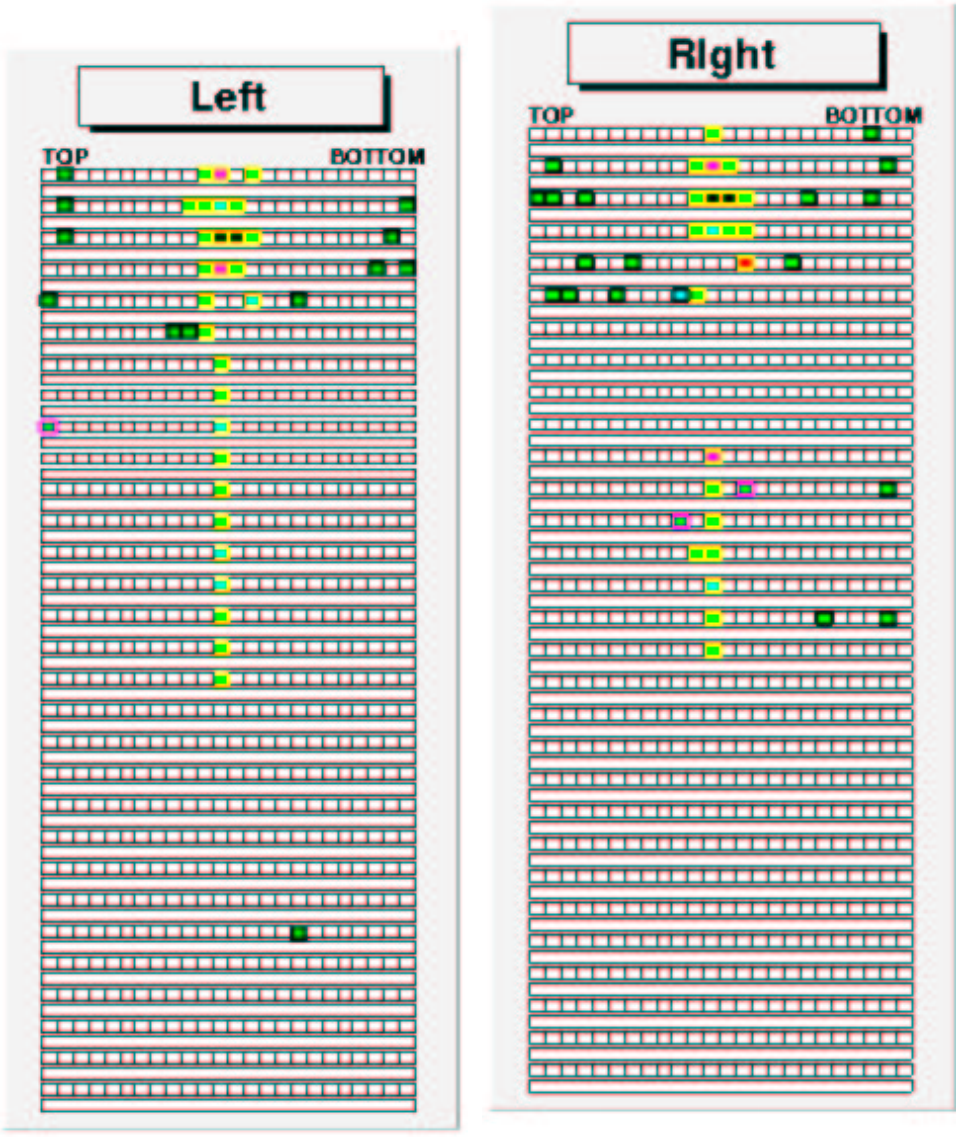
- 3 GeV muons generated in Geant 3.21 (thanks Ruben!)
- These should all go straight through
- 84 out of 5000 went out of the side = 1.68%

Problems



- Left: This does not look like a 3 GeV muon!
- Right: This muon has not come down the beampipe!

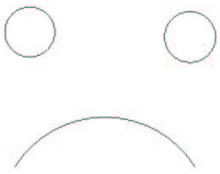
Problems



- Large portions of track seem to be missing
- Maybe these muons have not been triggered correctly

Next...

- Only about 1% of events in a run are muons
- A fraction of these are valid muons
- No side-exiting muons found so far - Too low statistics



- Optimise cuts for 3 GeV muon selection
- Run over every 3 GeV run we've ever done
- Try 2.4 - 2.6 GeV for better statistics