Estimating DCH Background with Bruno: method validation

Riccardo Cenci
University of Maryland

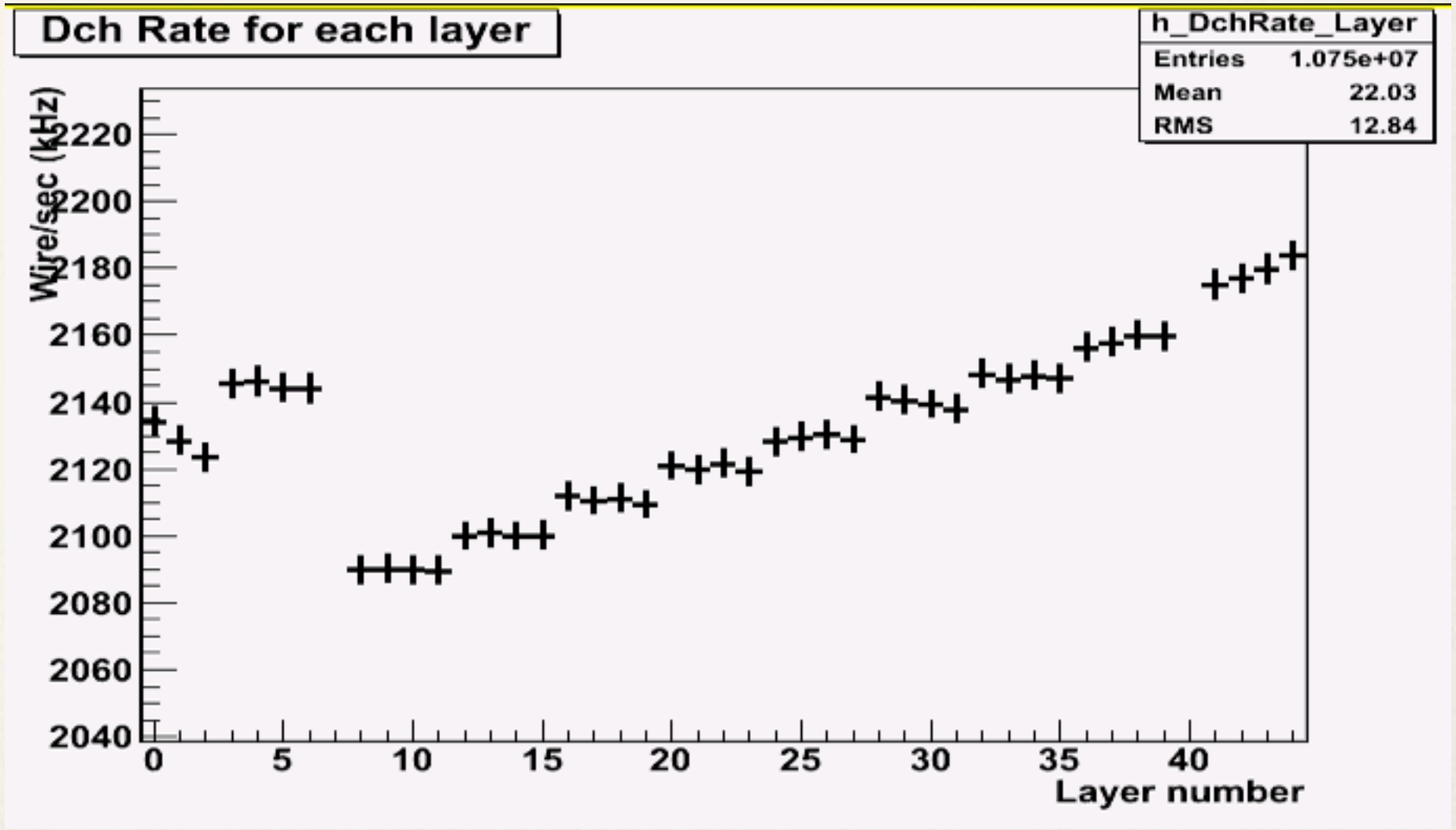
Drift Chamber Phone Meeting

January 31st, 2011

Last week

- Trying to get a flat rate for single particle
  - Muons, 1 GeV, theta 90 degrees
  - 2 MHz freq, 2 muons per DCH integrating time
  - Approx 120-250 cells per layer, ~1% occupancy expected

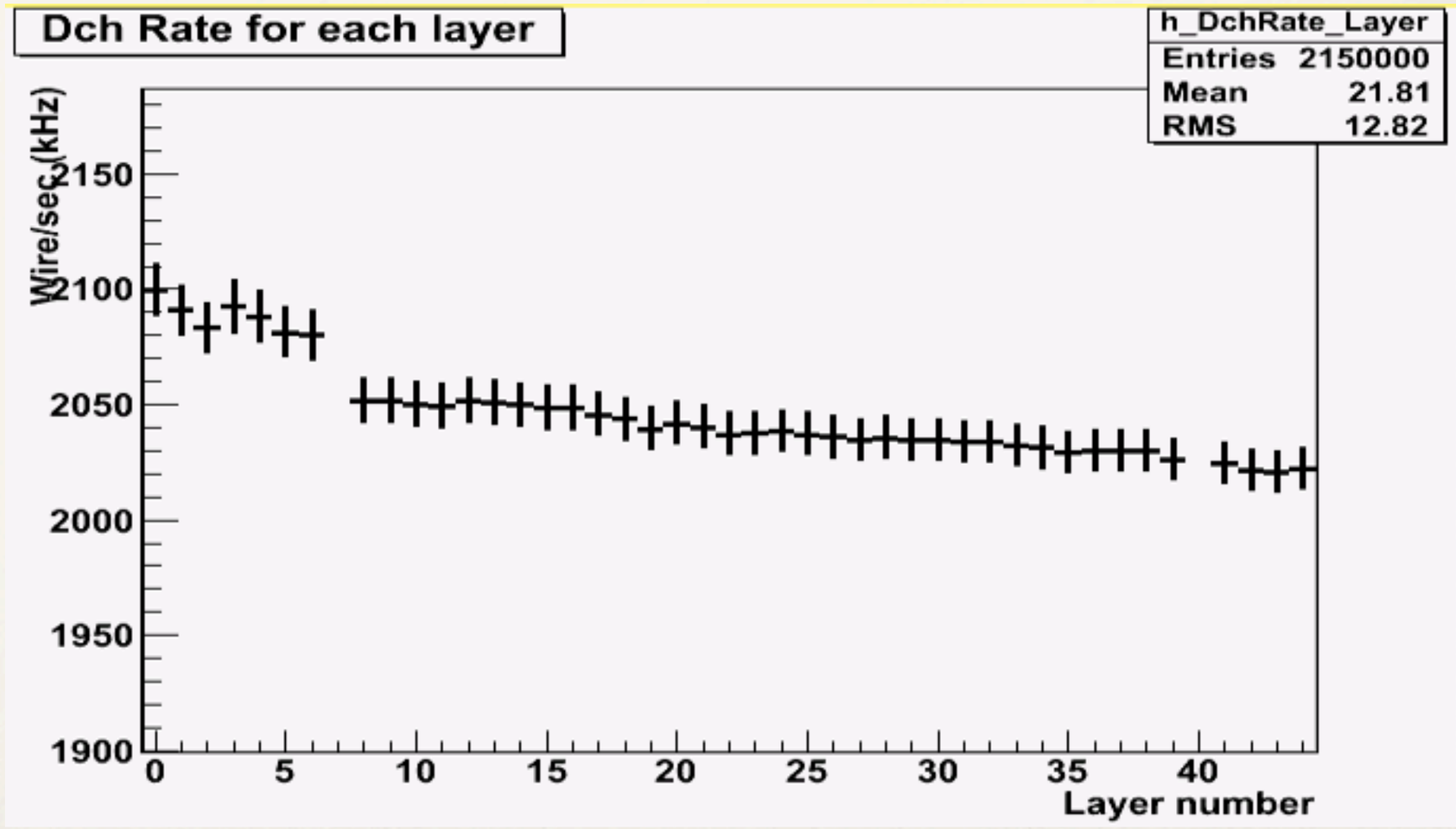
- Rate per layer
- No threshold on single cell energy
- Almost flat but not fully understood



More validation

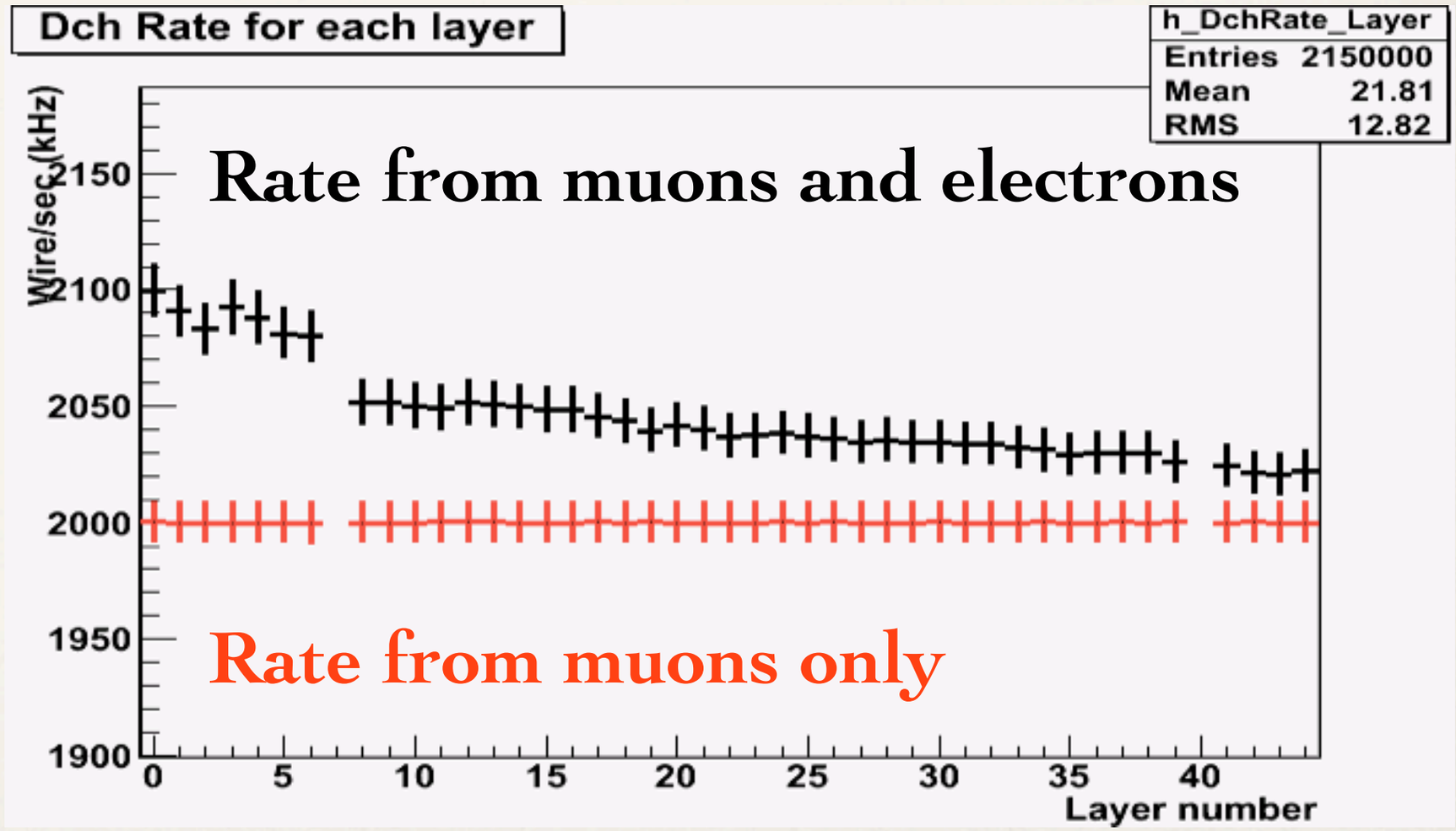
- Trying to get a flat rate for single particle
  - Muons, **1 TeV**, theta 90 degrees
  - 2 MHz freq, 2 muons per DCH integrating time
  - Approx 120-250 cells per layer, ~1% occupancy expected

- Rate per layer
- No threshold on single cell energy
- Still not flat



Validation

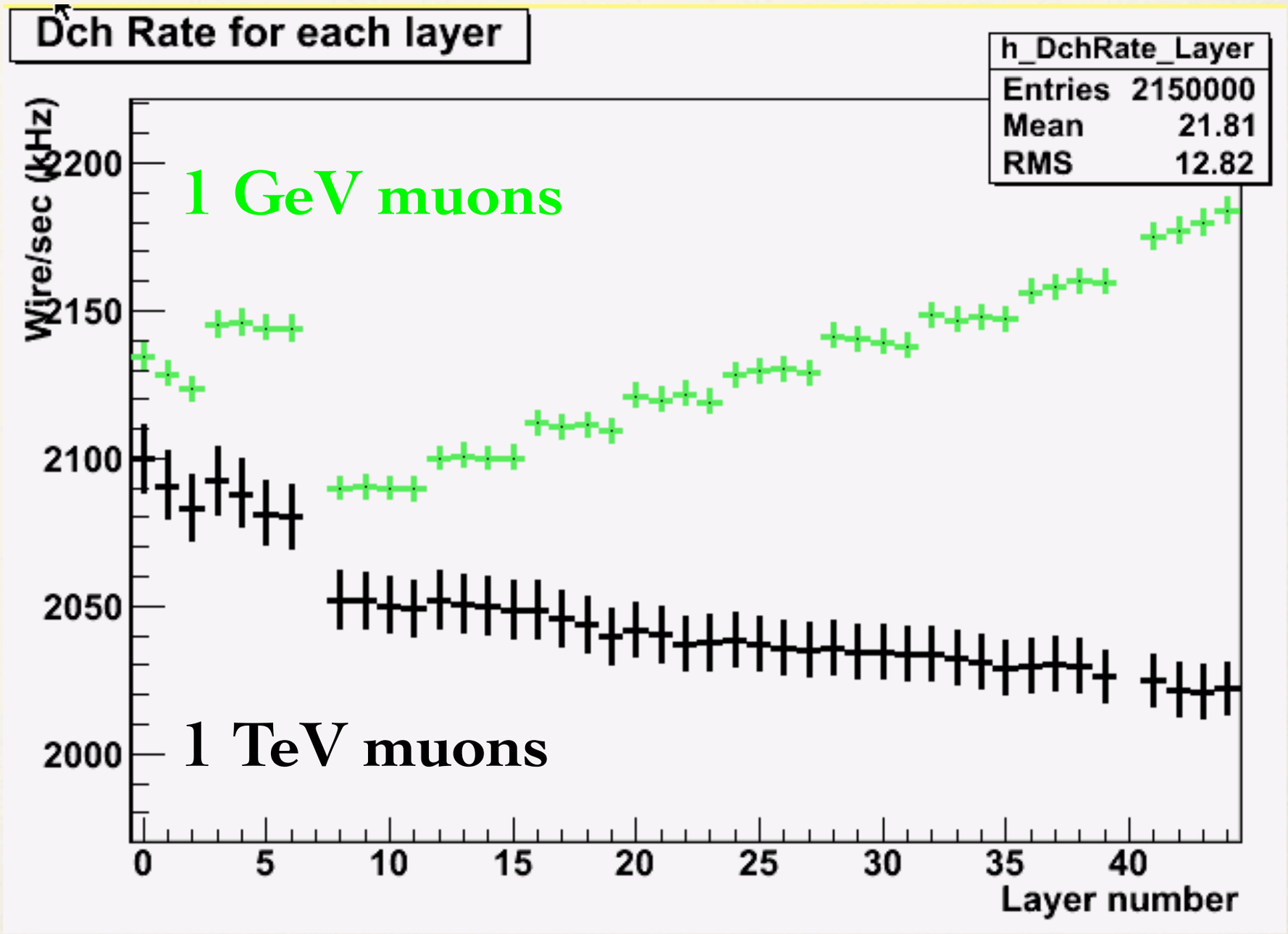
- Good suggestion from M. Piccolo, still we have delta rays effect
- Measuring the rate only from muons and not from electrons
- Rate is now flat



Validation

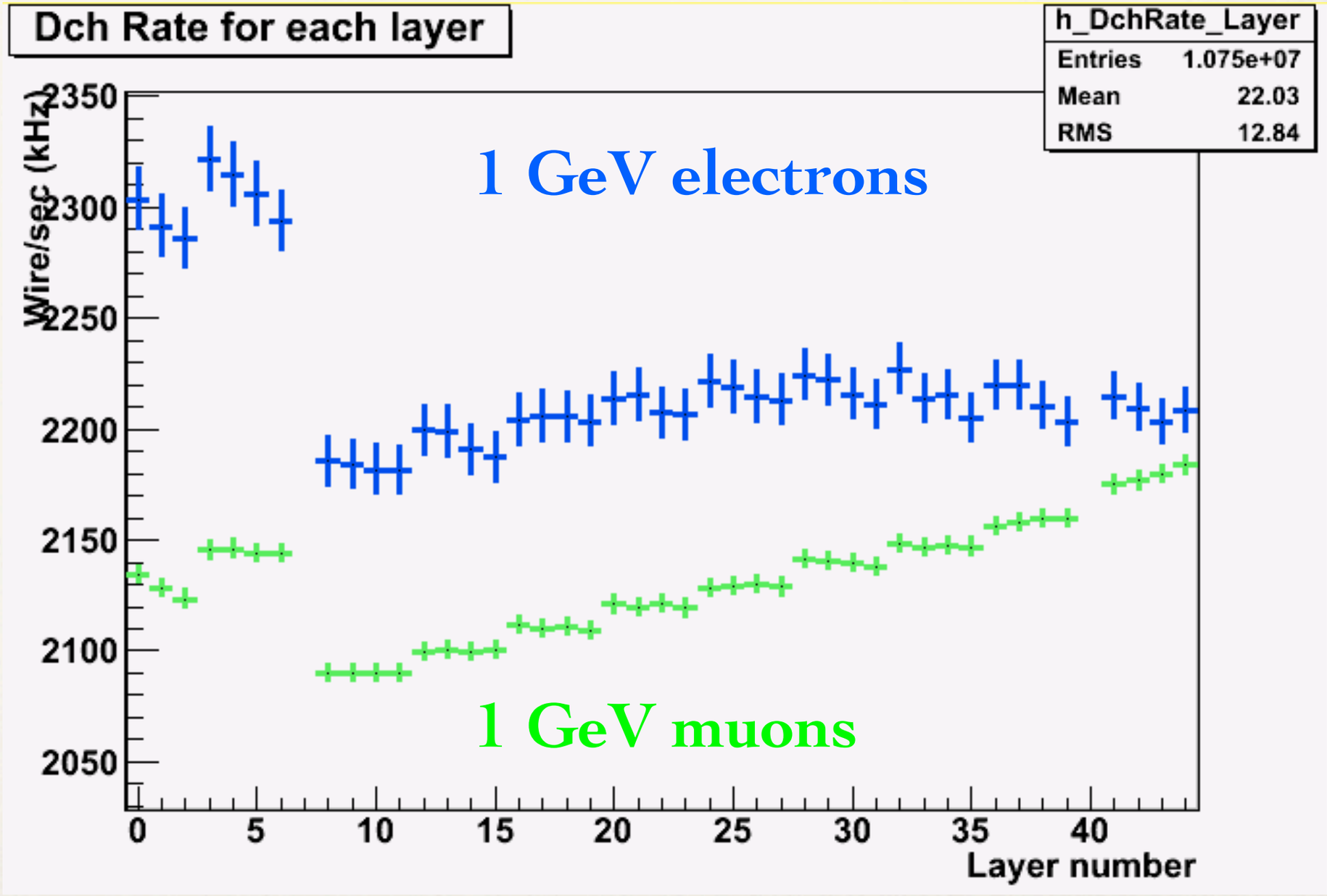
- Comparison between muons of 1 TeV and 1 GeV

- Curvature of tracks increases rate on outer layers



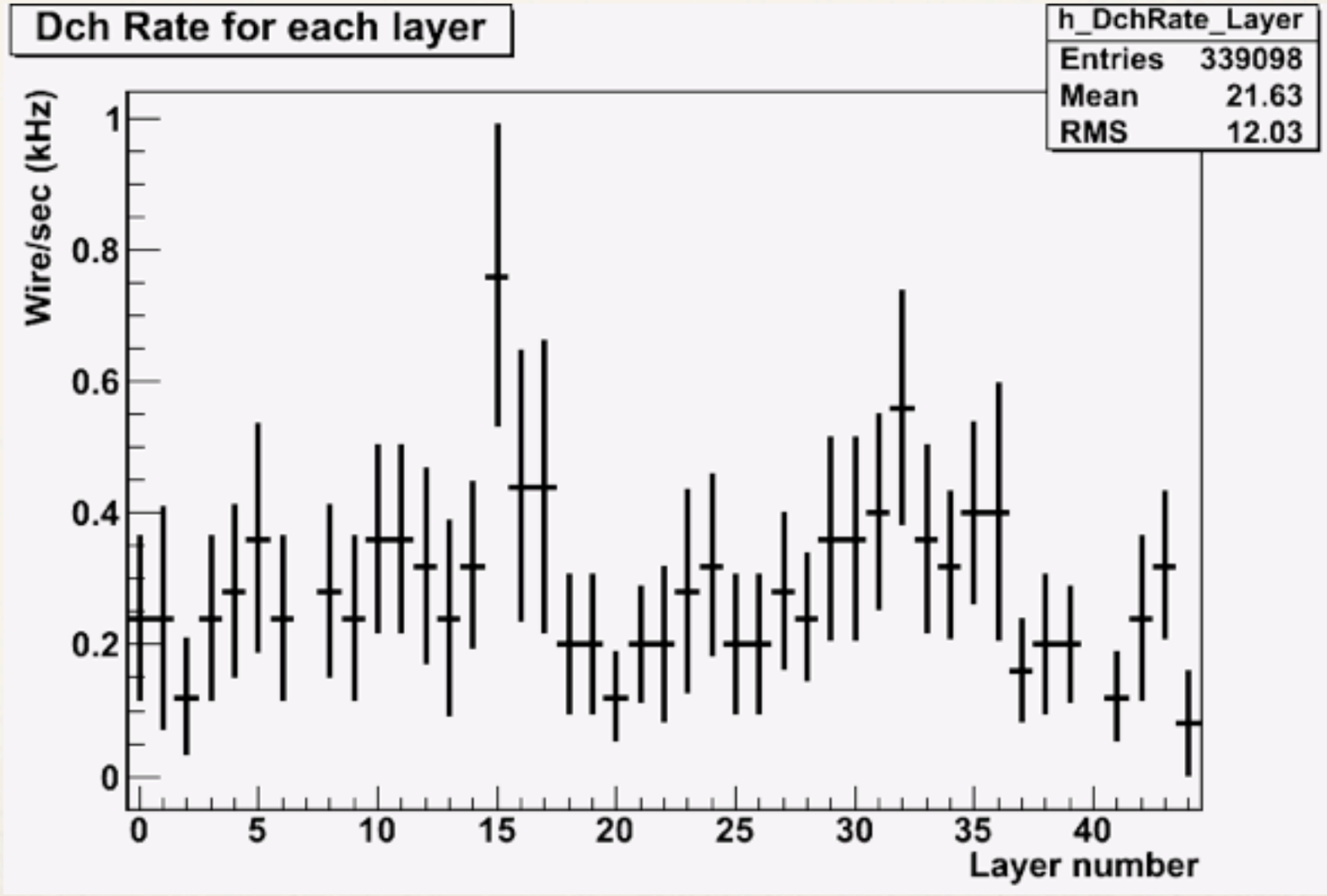
Validation

- Comparison between muons and electrons of 1 GeV
- No difference between electrons and positrons



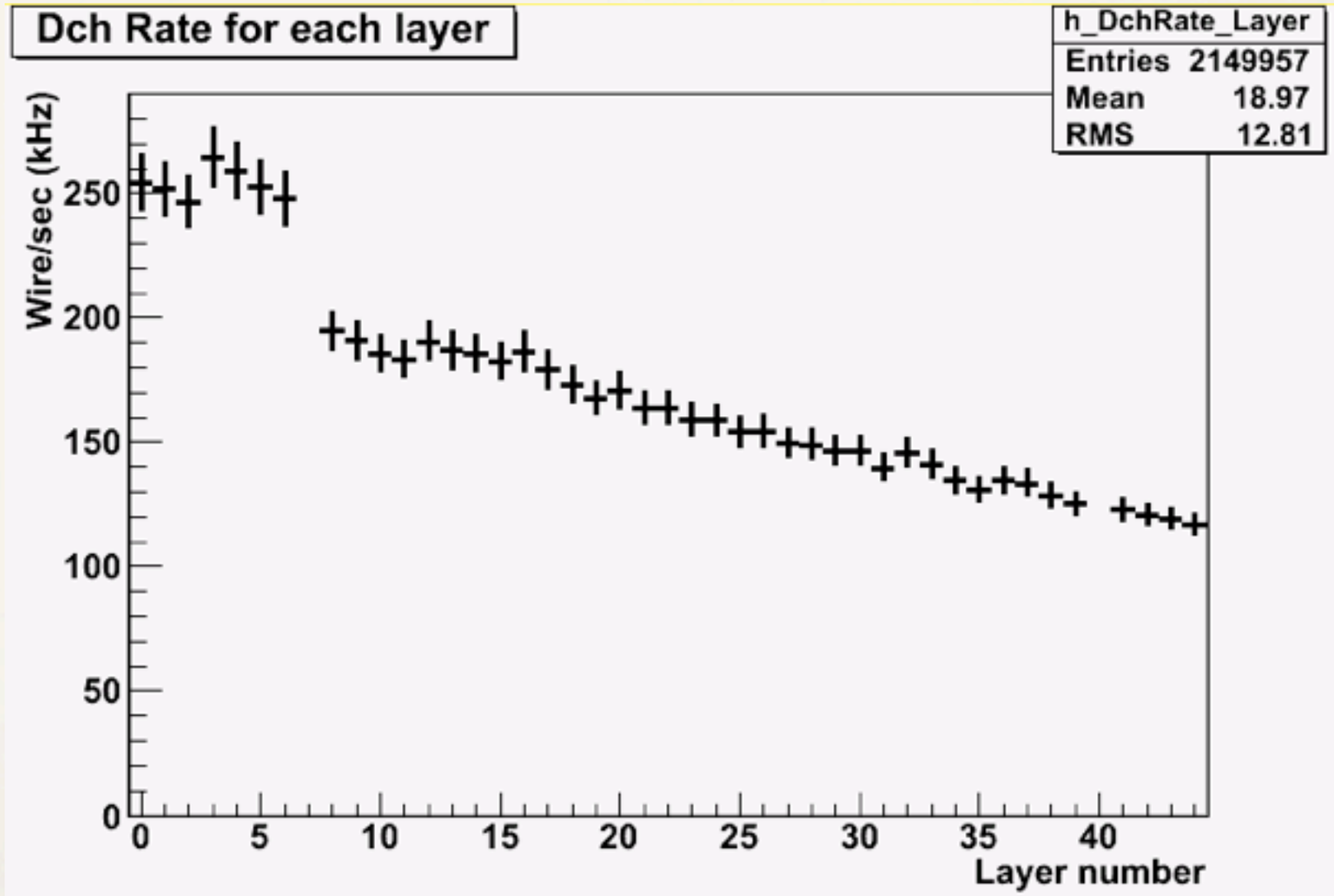
Validation

- Low energy electrons (2 MeV), occupancy is really low, 1 kHz
- But rate for those electron per event is not 2 MHz
- Raw measure: 16 GHz (0-10 MeV electrons)



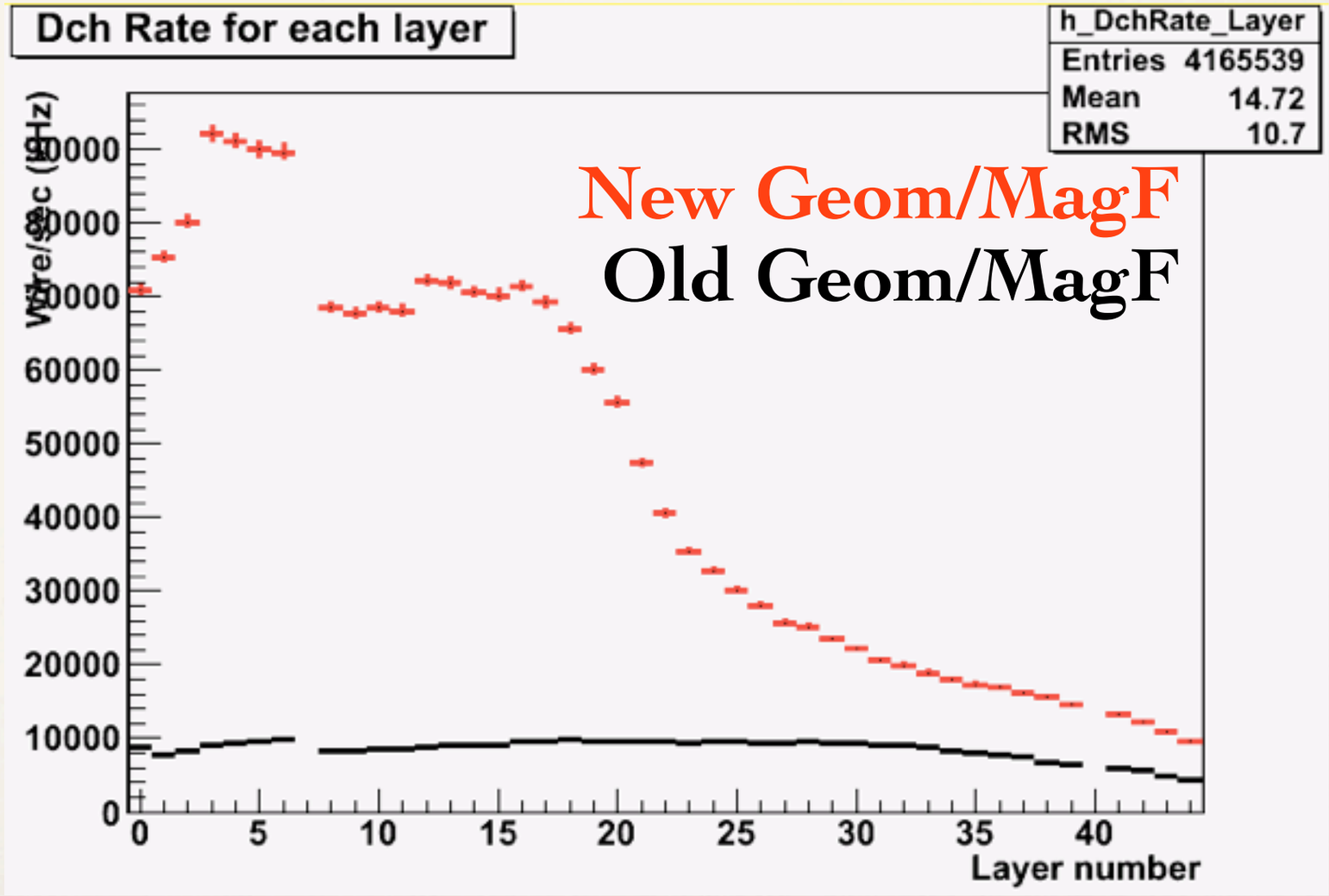
Validation

- Gamma, 1 GeV, 2 MHz
- Dch rate is 200 kHz, but not so many photons with this energy
- Raw measure: 1 GHz between 0-10 MeV



New productions

- Cross-checks productions were ready last week
- Old Geant4 (9.2), new Bruno version
  - Old final focus and old magnetic configuration Occupancy 4.6%
  - New final focus and new magnetic configuration Occupancy 21%



Next steps

- Single particle rates are ok
- Realistic IP rates from RadBhabha to be estimated
- New cross-check production with new geometry and old magnetic config (or viceversa)
- Geometry is the culprit, we have a problem: no space to put back the shileding
- Magnetic field is the culprit, issue ongoing from long time, hopefully we will have a definitive version soon from accelerator people