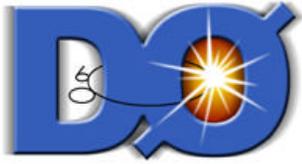




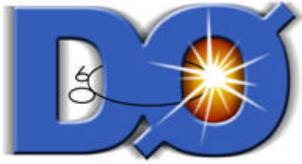
L1Muon Simulation

Rob McCroskey
University of Arizona
for the L1MU group



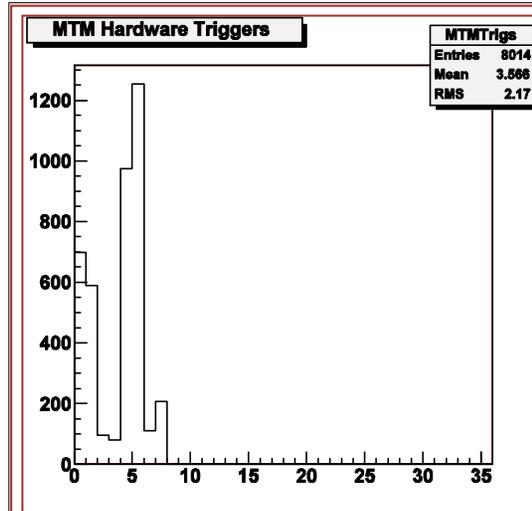
Hardware/Simulator Agreement

- **Scintillator triggers**
 - ◆ Single muon agreement to $<1\%$
 - ◆ Dimuon agreement to $\sim 3-4\%$
 - Differences largely due to bug in simulator which misses events with D_h or D_f of 2 - $DR \sim 0.5$
 - 3-4% is from data - discrepancy in physics MC would depend on DR of the dimuon events
- **A-layer Wire triggers**
 - ◆ Central (PDT) agreement to $\sim 1\%$
 - ◆ Forward (MDT) agreement to $\sim 3\%$
 - Still tracking down differences here

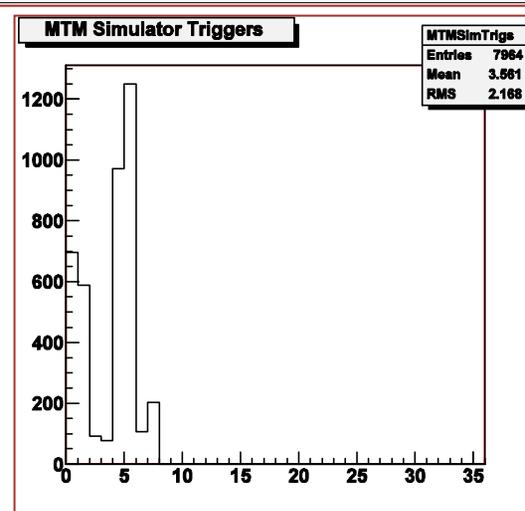


Online Hardware/Sim. Comparison (Scint. Terms)

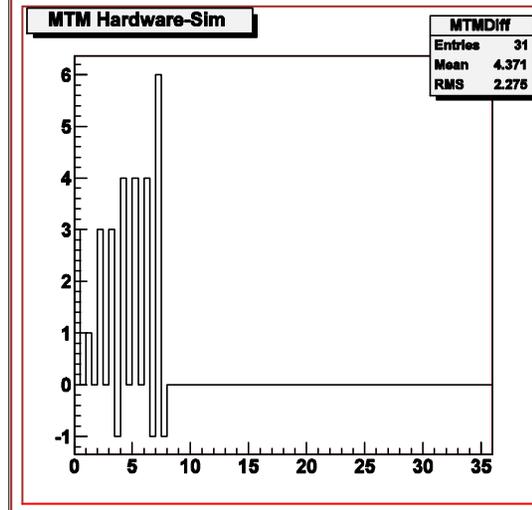
Raw hardware
triggers (and/
or terms)



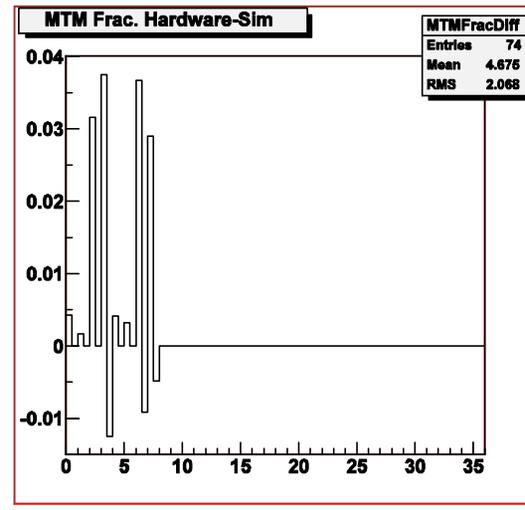
Raw simulated
triggers

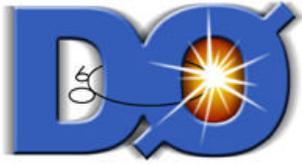


Raw difference



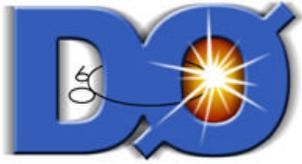
Fractional
difference





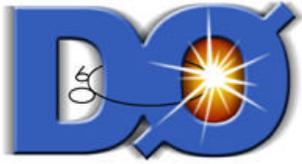
Near-term Improvements

- **L2 data passthrough mode**
 - ◆ When running on data, we are not correctly sending the L2 message as generated from our L3 hardware message
- **Scintillator algorithms**
 - ◆ Possible small tweaking of trigger roads (.rcp)
- **Wire algorithms**
 - ◆ Add B/C layer matching using confirmed scintillators in the central (Jeff Temple) and forward (Rob McCroskey)
 - ◆ Find/fix hardware/sim differences in the forward region (Jason Kasper, Rob McCroskey)
- **CFT algorithms**
 - ◆ Match logic to hardware
 - ◆ Use .rcps to form hardware equations
 - ◆ First pass written (Noah Wallace) – will test next week



Near-term Improvements

- **Regional Logic**
 - ◆ Add octant matching of scint. And wire triggers
 - Done (Stefan Anderson), awaiting testing
 - ◆ Necessary for global trigger list 10.0 and beyond where we have scintillator and wire triggers
- **Global Logic**
 - ◆ Add octant matched regional terms (Ken Johns) to global trigger list



Conclusions

- **tsim_l1muo** simulates scintillator based triggers reasonable well
 - ◆ Fixing small remaining 'count to 2' bug
- **A-layer wire centroids** also close
 - ◆ With addition of regional and global logic, we will then have correct simulation of the 'tight-loose' triggers in 10.0
- Working on making CFT algorithms match hardware for easy modification of both