## "Studies of hadron shower profiles using 2004 and 2006 H2 test-beam data with CMS Calorimeters"

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It looks like G4 predicts higher energy deposition in our ECAL crystals (green histogram) than we see in TestBeam (black).

## h\_eEcal h\_eEcal7x7 eEcal h eEcal h\_eEcal7x7 eEcal QGSP 5GeV pim QGSP\_BERT\_5GeV pim 8800 7400 7400 Entries Entries 8800 Entries Entries 0.06 0.06 Mean 1.569 Mean 1.345 Mean 1.73 1.59 Mean RMS 1.217 RMS 1.074 RMS 1.221 RMS 1.138 0.05 0.05 Underflow 0 Underflow 0 Underflow 0 Underflow 0 Overflow 0 Overflow Overflow Overflow 0 0 0 0.04 0.04 0.03 0.03 0.02 0.02 0.01 0.01 00 0 2 3 2 3 5 1 4 1 4 EB energy [GeV] EB energy [GeV]

## It has been pointed out that we might be suffering from transverse containment effects:

(Perhaps much more so in QGSP\_BERT than in QGSP.)





QGSP\_BERT is more sensitive to ECAL matrix size.



**QGSP\_BERT** 

QGSP

TB2006 data

- more MIPs in QGSP\_BERT ??

- Skew?





NB! in G4 beam is still point-like (zero width). In TB06 beam is 2x2cm ( $\approx 1$  crystal) wide.



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- without the L0 cut QGSP\_BERT looks very much like LHEP.

- with the L0 cut QGSP\_BERT is dramatically different. Why?

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- G4 simulation of hadronic showers is still under investigation.
- QGSP\_BERT shows remarkable agreement with data and old LHEP sometimes, but is real or coincidental?
- Shower profiles of QGSP\_BERT do look different from LHEP/QGSP
- Simulate the transverse shape of the TB04 beam.
- Get new/better Longitudinal shower data from TB2007.

