Pileup in LAr

- Two main effects
  - energy shifts (if only "in time" pileup), become 0 for 25 ns or 50 ns bunch spacing

  - Increased RMS (overall pileup+electronics noise optimized with OFC when out of time pileup also)   (non gaussian noise)

- Baseline procedure (also done on MC):
  - Include pileup noise RMS in total noise RMS used for noise suppression cut (cluster finding)

  - Correct energy offset at cell level before any clustering / combined reco

  - Both are done = f(lumi) from database stored quantities

- Software all in 15.6.10 (modulo Tile cell offset correction)

- offset + noise can be determined from zero bias + random in empty bunches

- pileup values in database are all 0 now, main question is when to populate DB with non 0 entries
  - more "private" validation/checks vs having data sets with different calibrations.

  - This will clearly impacts low energy clusters in the end-cap region
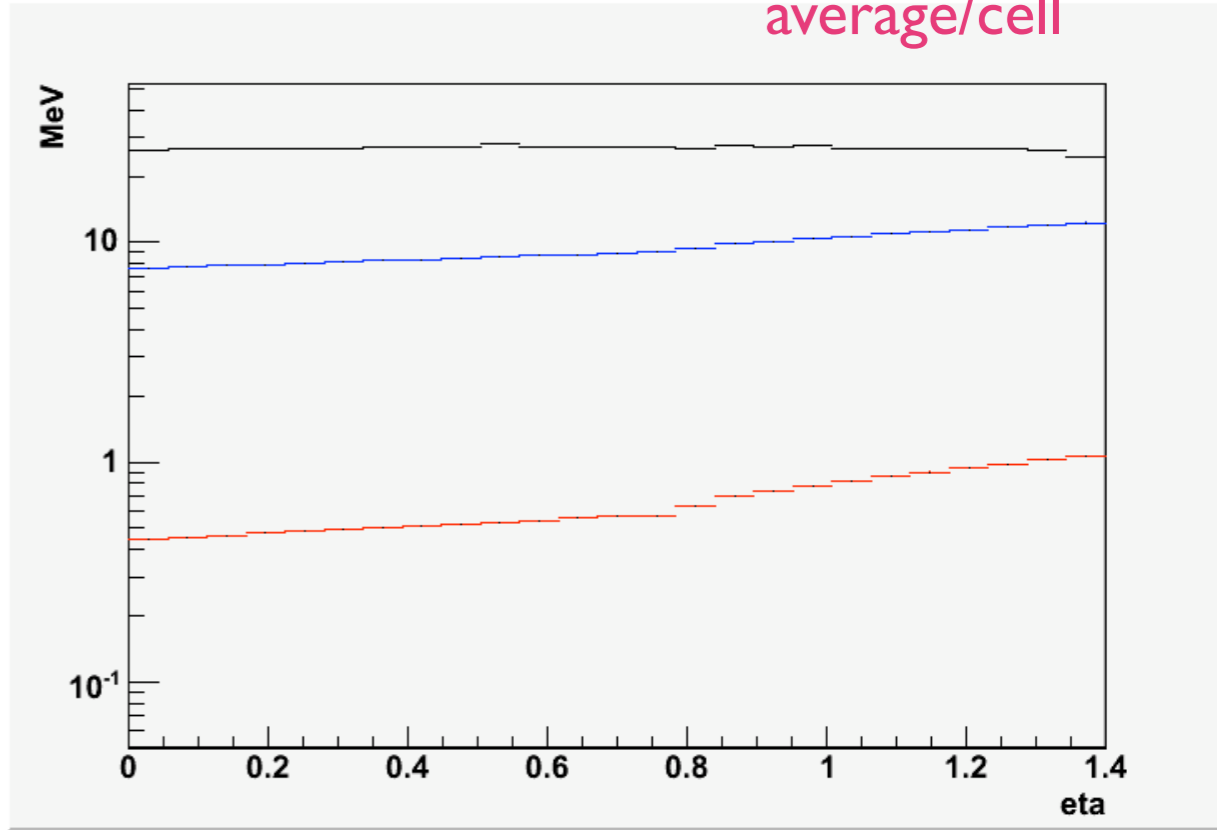
Examples of effect for Ncol=3 (only in time pileup):

Shifts and RMS > electronics noise for eta>2.5 => impact clustering

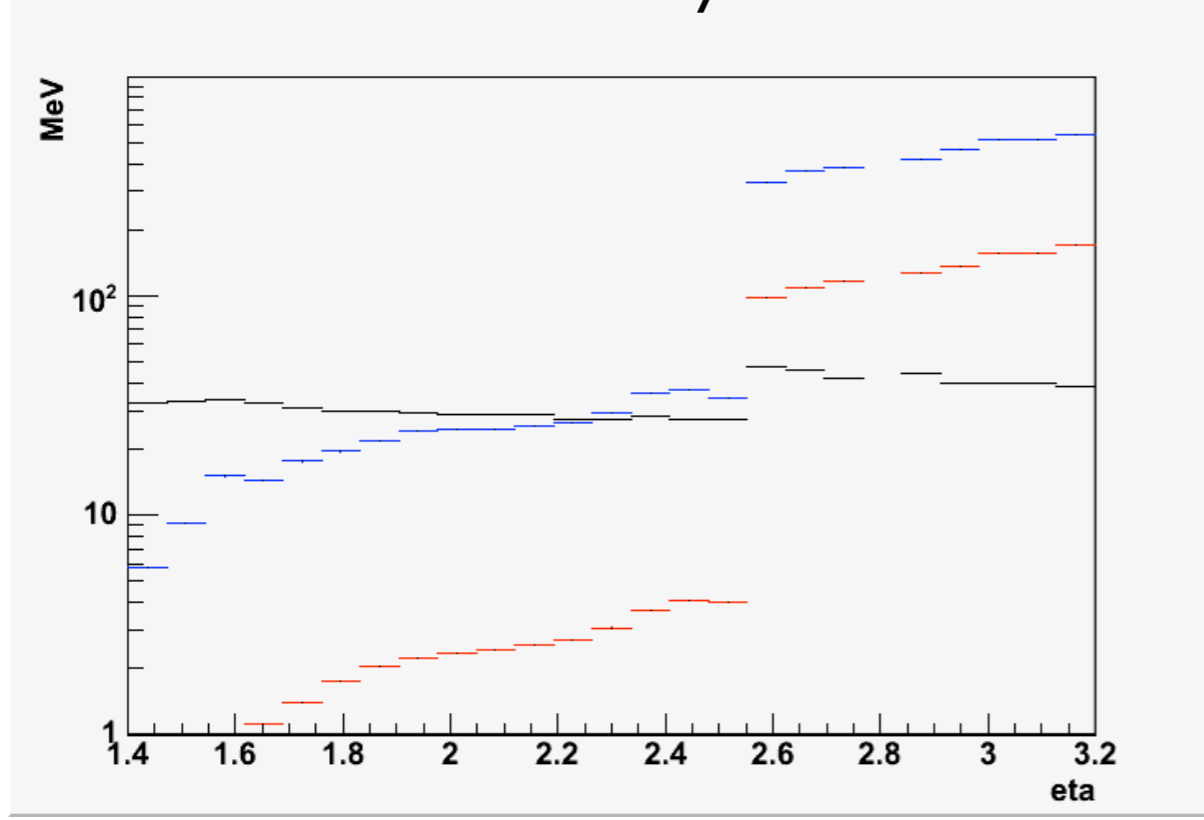Smaller energy shift per cell in barrel (but still integrates to O(1GeV) over a DR=0.6 jet size)

Average scales ~lumi and RMS ~sqrt(lumi) (for a given bunch filling pattern)

elec noise
pileup noise
average/cell

EMB layer2

EMEC layer2

FCAL layer 0