Algorithm TileGeoG4SD was modified and now it can store time and Energy of hit inside TileHit object. Before time of the hit was ignored.

Precision of saved time is defined by parameter DeltaTHit in TileInfo.

By default value of DeltaTHit in TileInfo is zero and in such a case the time is not taken into account, i.e. behaviour is the same as before

DeltaTHit can be set to any value, e.g. to 0.5 or 1 or 5 ns

The tests were made with different DeltaTHit and comparison of energies reconstructed by FitFilter method shows that there is no significant differences for time granularity 0.25, 0.5, 1 and even 5 ns.

If the time of the hit is ignored completely (and delta function is convoluted with signal shape for digitizer), energy reconstructed with FitFilter method is 2% smaller than energy from Geant4 stored in TileHit

If time is taken into account energy after FitFilter is 4% smaller than original energy in TileHit

Details of simulation:
Full ATLAS setup, but TileCal only, no LAr and InDet in front
10 GeV pions

Original energy divided by energy after FitFilter:

Einitial/Efinal	DeltaTHit	Number of events
0.98	0 (time ignored)	200
0.96	0.25ns	200
0.96	0.5ns	200
0.96	1ns	200
0.96	5ns	200
0.980	0	1000
0.961	1ns	1000

All histograms below made from 1000 events and DeltaTHit = 1ns.
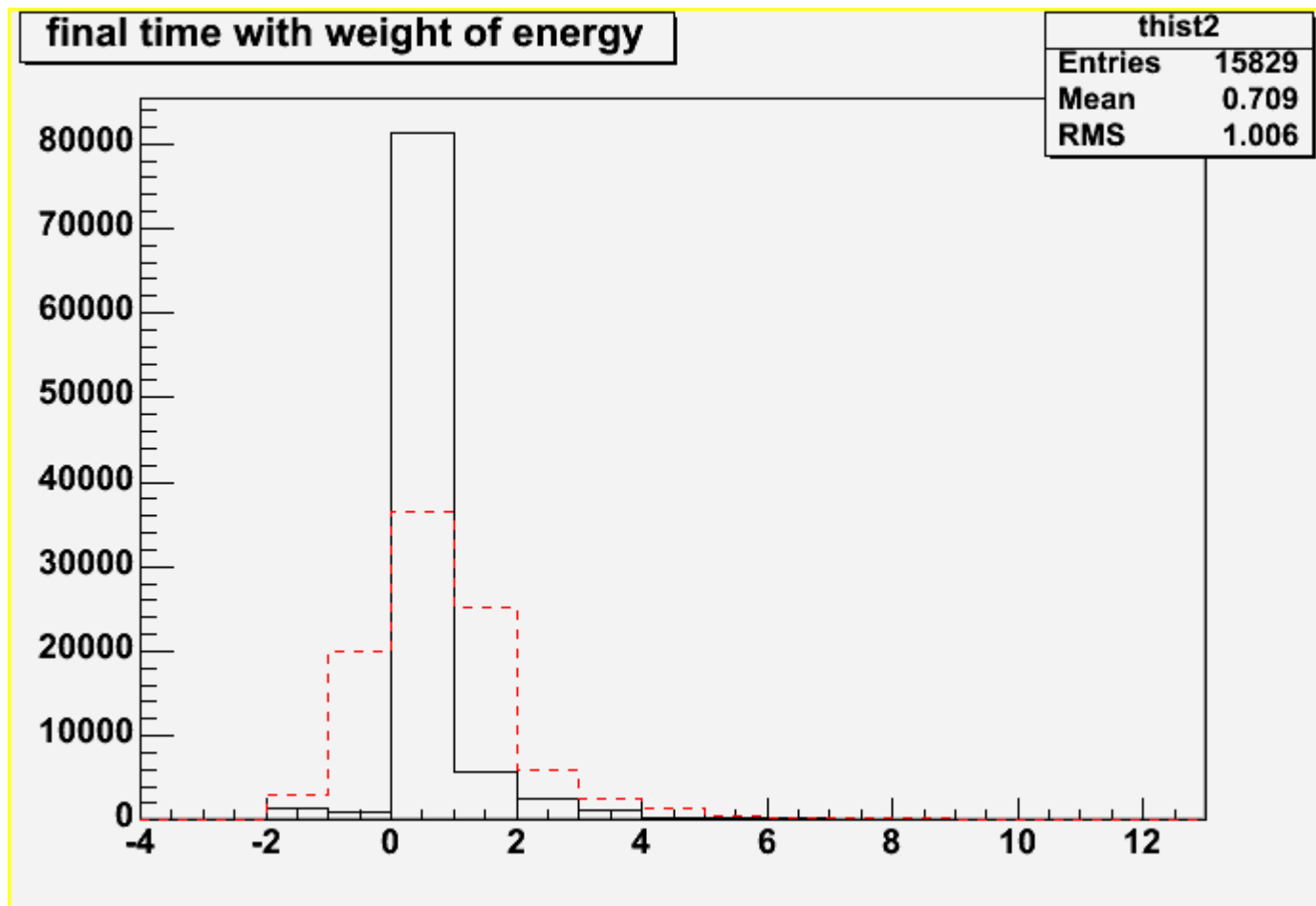
Reconstructed time weighted with energy (i.e. after digitization and FitFilter) in black
Original hit time from Geant4 (stored in TileHit) weighted with energy in dotted red
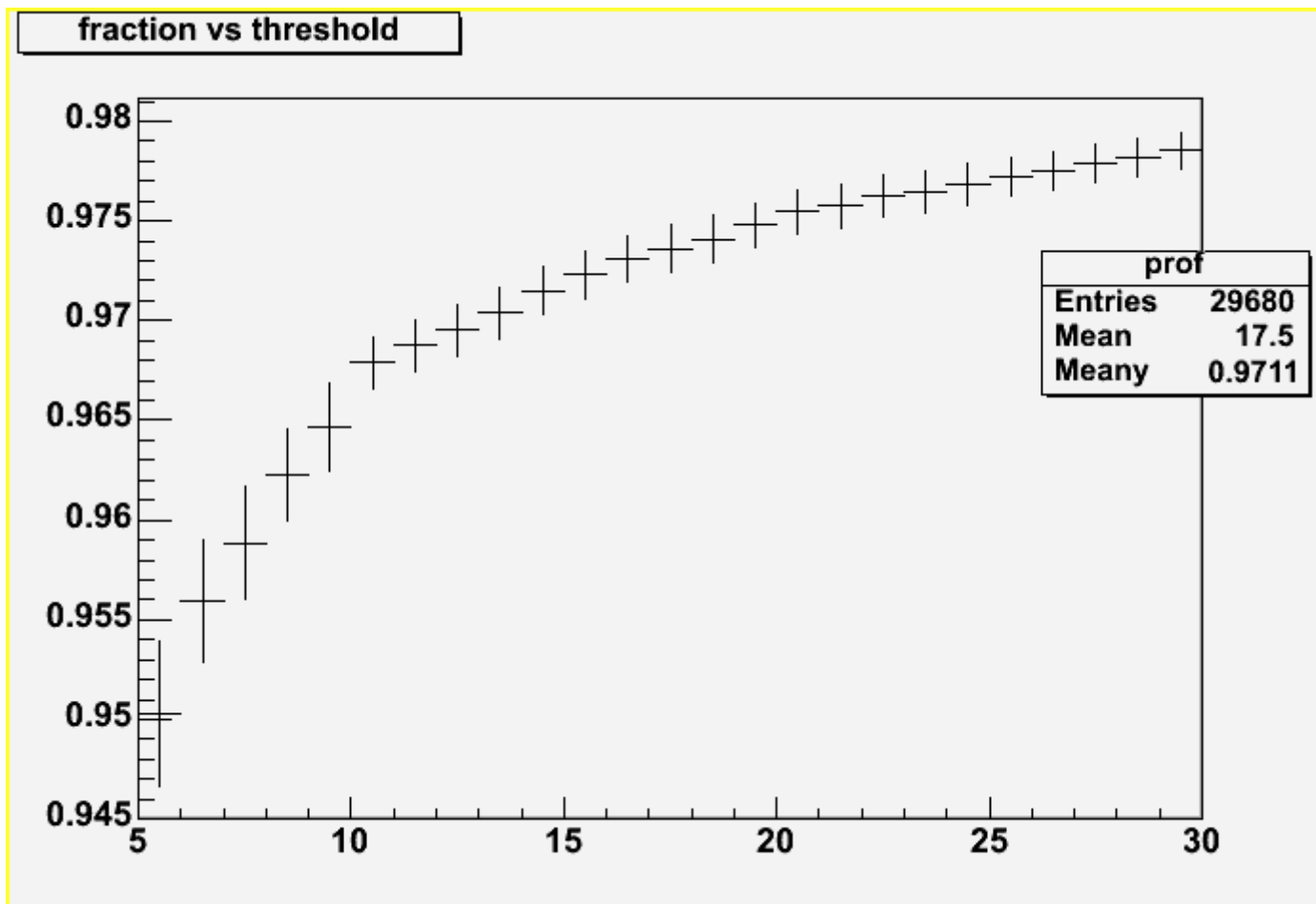
Distribution of energy in TileHitVector: fraction of energy that releases in time inteval from 0 to threshold time in ns, e.g. 0.965 at 10 ns point means that 96.5% energy deposited in first 10 ns
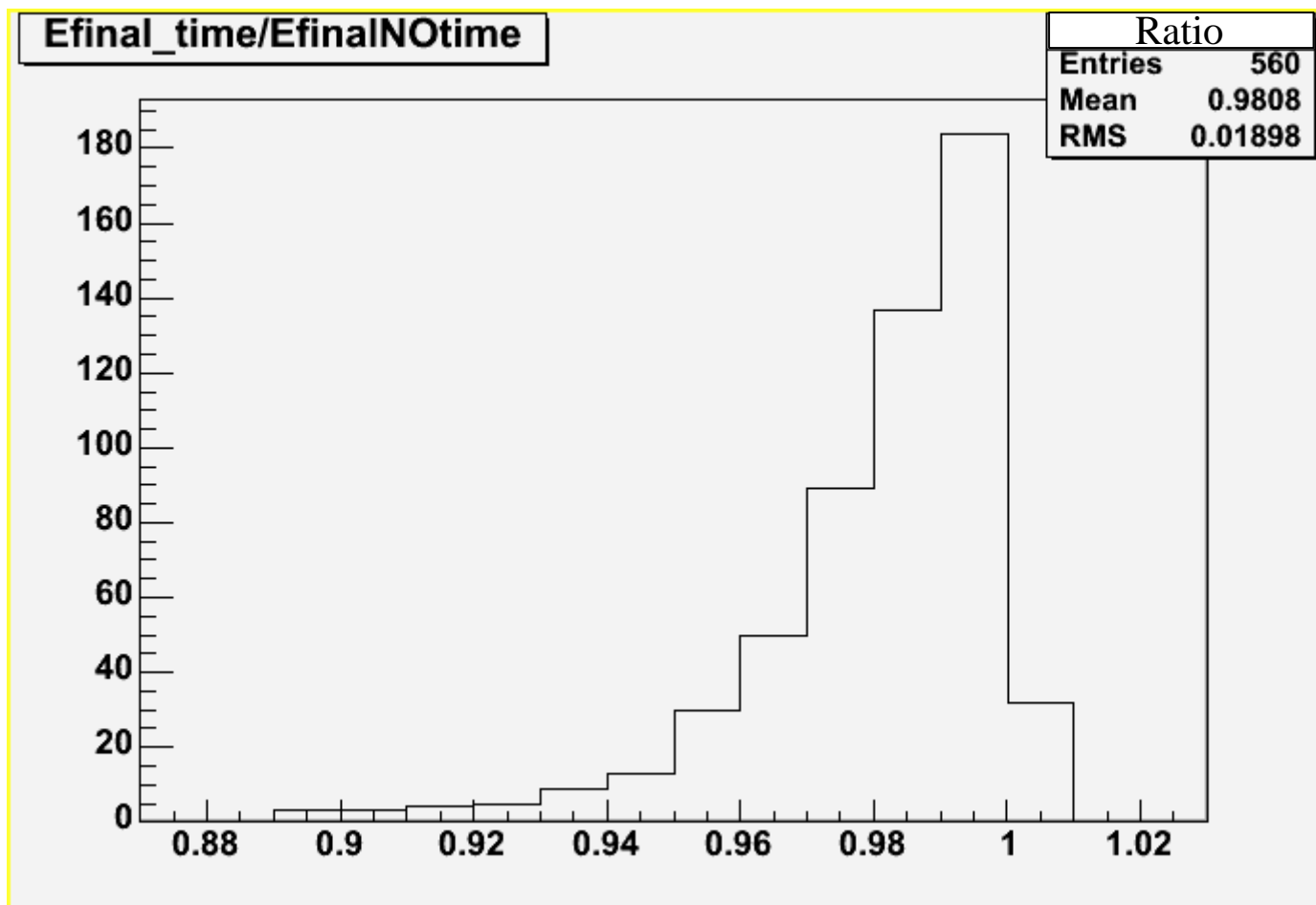
Ratio of energy after FitFilter with time saving to energy after FitFilter with time equal to zero.
Average difference is 2%.