

Study of pion response using the new FFT OF weights

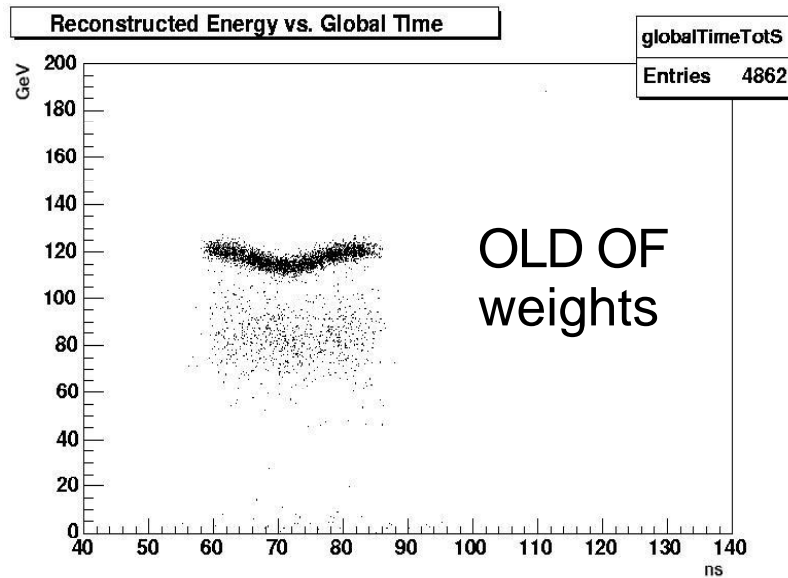
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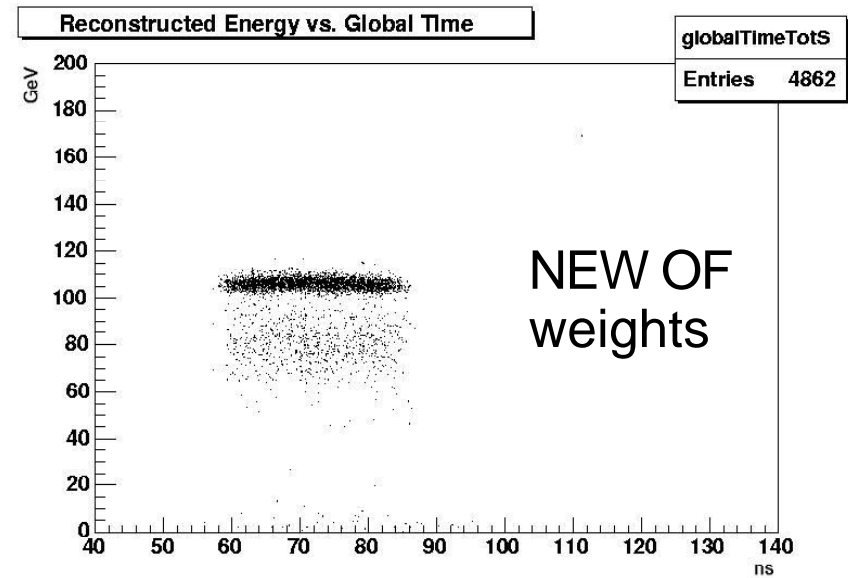
Methods

- All analysis done using TBRotAna package (M. Lefebvre and I. Gable)
- Work in electromagnetic scale with
 - EMEC: $a_{\text{em}} = 0.0003855 \text{ GeV/nA}$
 - HEC: $a_{\text{had}} = 0.003266 \text{ GeV/nA}$
- For now, working with a fixed list of cells for a given impact point instead of a clustering algorithm
- Resolution minimized through the parameter x
 - $E_{\text{meas}} = a_{\text{em}} * E_{\text{EMEC}}(\text{nA}) + x * a_{\text{had}} * E_{\text{HEC}}(\text{nA})$

Confirmation of Method



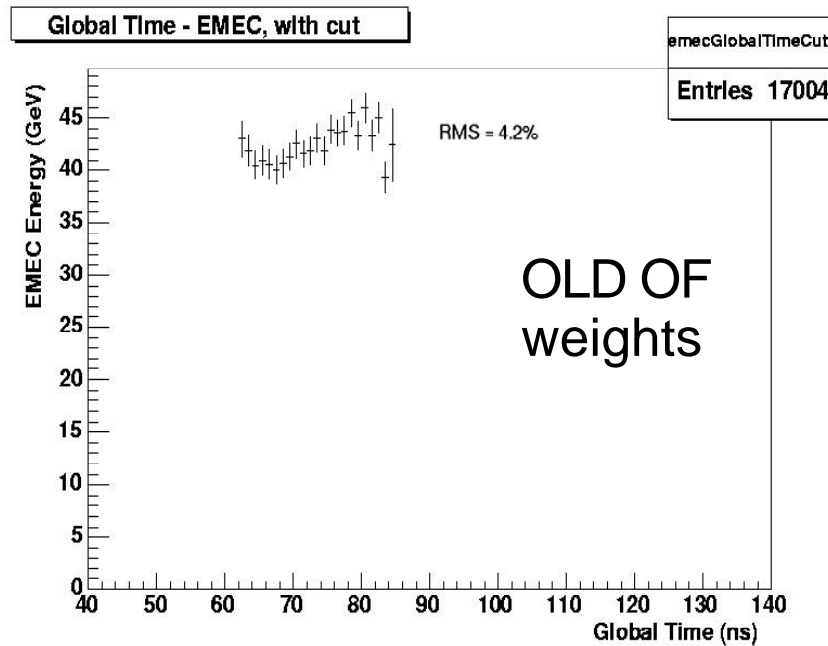
e+ 119 GeV Point E5, using old OF weights



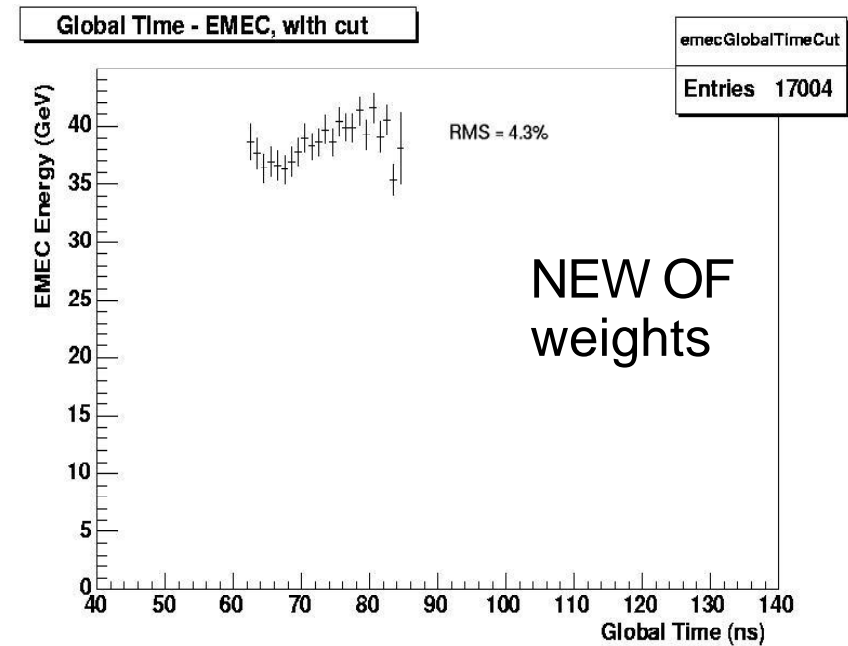
e+ 119 GeV Point E5, using new FFT OF weights

- Test performed on work previously presented by N. Kanaya
- Resolution for electrons does improve greatly

Effect of new FFT OF weights on pion runs



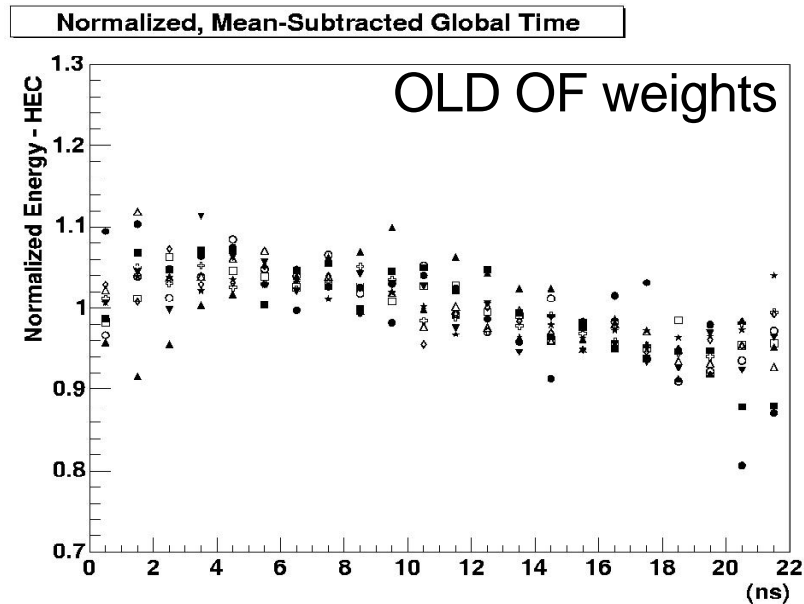
180 GeV pi+ Point I, using old OF weights



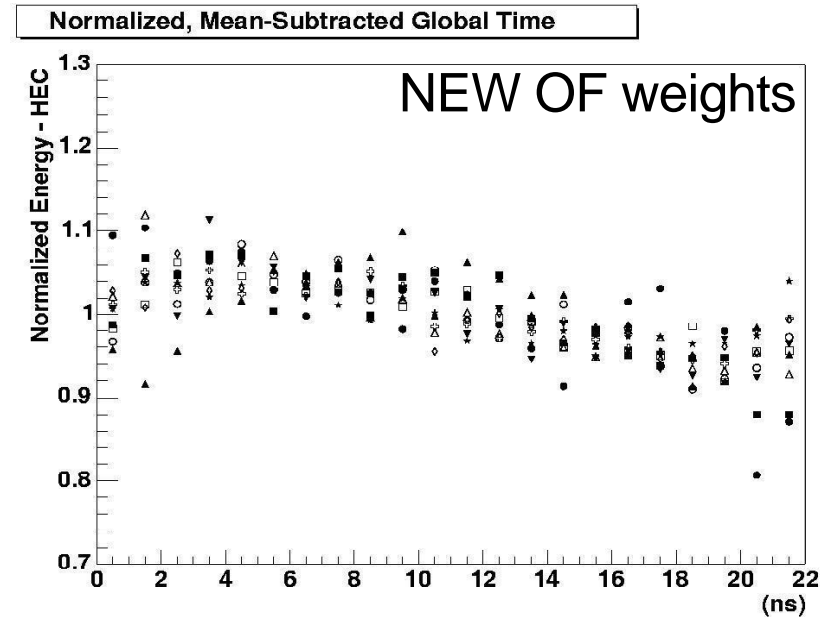
180 GeV pi+, Point I, using new FFT OF weights

- Cut made on events to restrict to a 22 ns "good" timing window
- EMEC energy reconstruction shows strong response dependence on global time
- New EMEC weights produce practically same results as old EMEC weights

Energy Dependence on Global Time in HEC



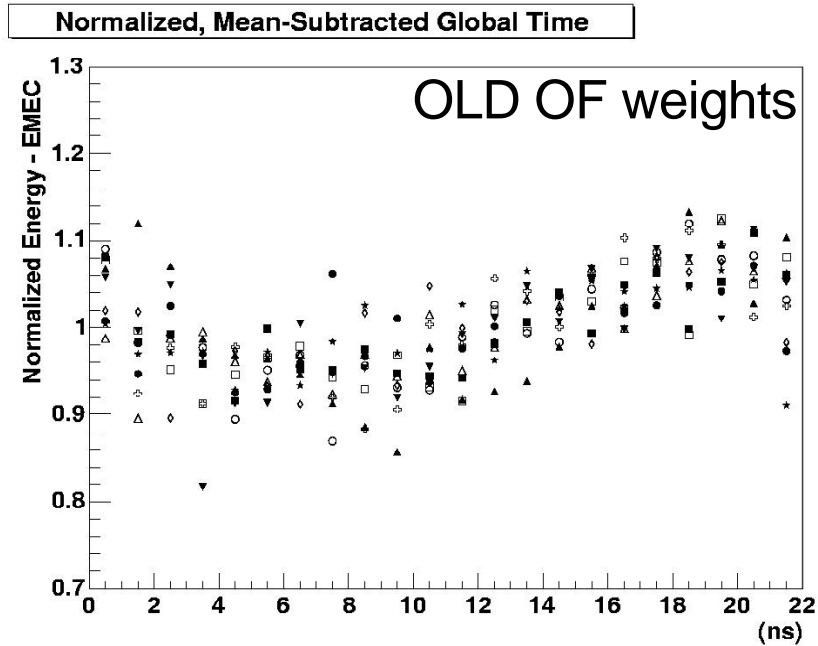
Impact point I, pions, energies 10 - 180 GeV,
using old OF weights



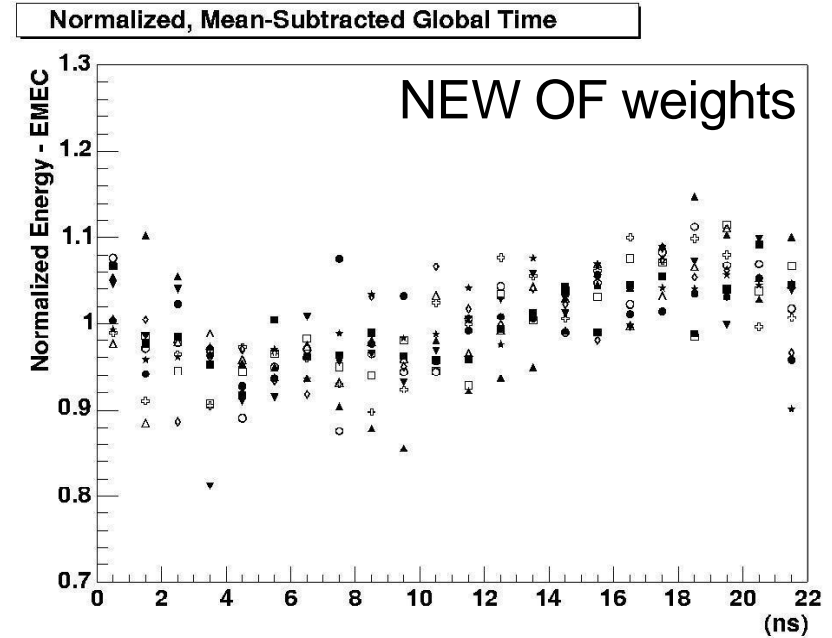
Impact Point I, pions, energies 10 - 180 GeV,
using new FFT OF weights

- Energies normalized and various pion runs plotted together
- Energy dependence in HEC is not affected by the new EMEC weights, as expected!

Energy Dependence on Global Time in EMEC



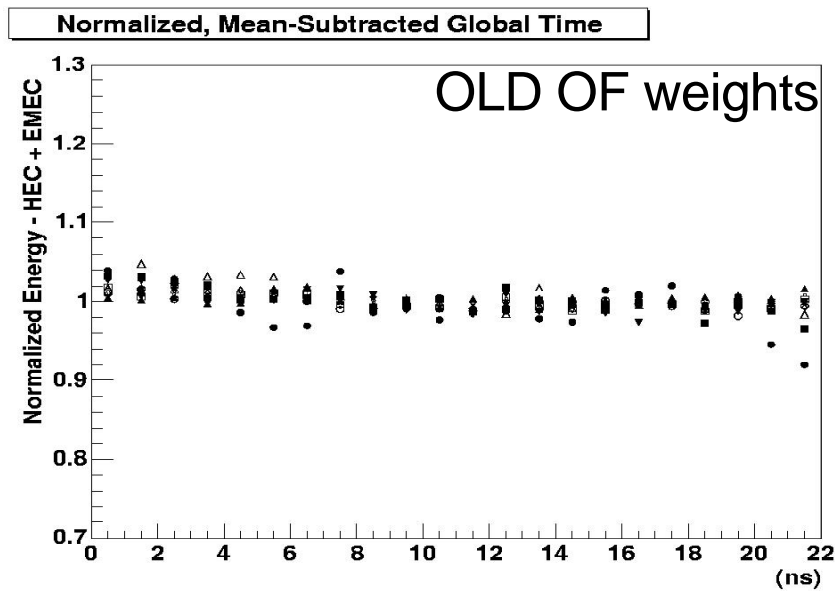
Impact point I, pions, energies 10 - 180 GeV,
using old OF weights



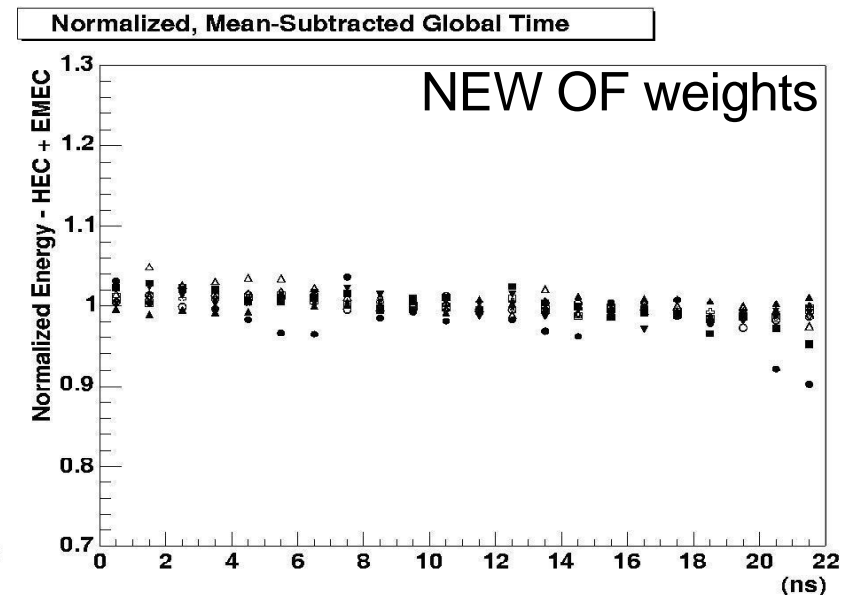
Impact point I, pions, energies 10 - 180 GeV,
using new FFT OF weights

- New EMEC weights produce practically same results as old EMEC weights

Energy Dependence on Global Time in HEC and EMEC



Impact point I, pions, energies 10 - 180 GeV,
using old OF weights



Impact point I, pions, energies 10 - 180 GeV,
using new FFT OF weights

- Global time dependencies in the HEC and EMEC response appear to cancel each other
- Making timing correction seems to have negligible effect on hadronic resolution

Prospects for Future Work

- Further investigate why the new OF weights do not correct the global time dependence of pion response
- Investigate hadronic weighting schemes