Loosening the cone

- M_{inv} 2 → 10 [GeV/c^2] note: this cut will have little effec
- E_{iso} 5 → 600 [GeV]
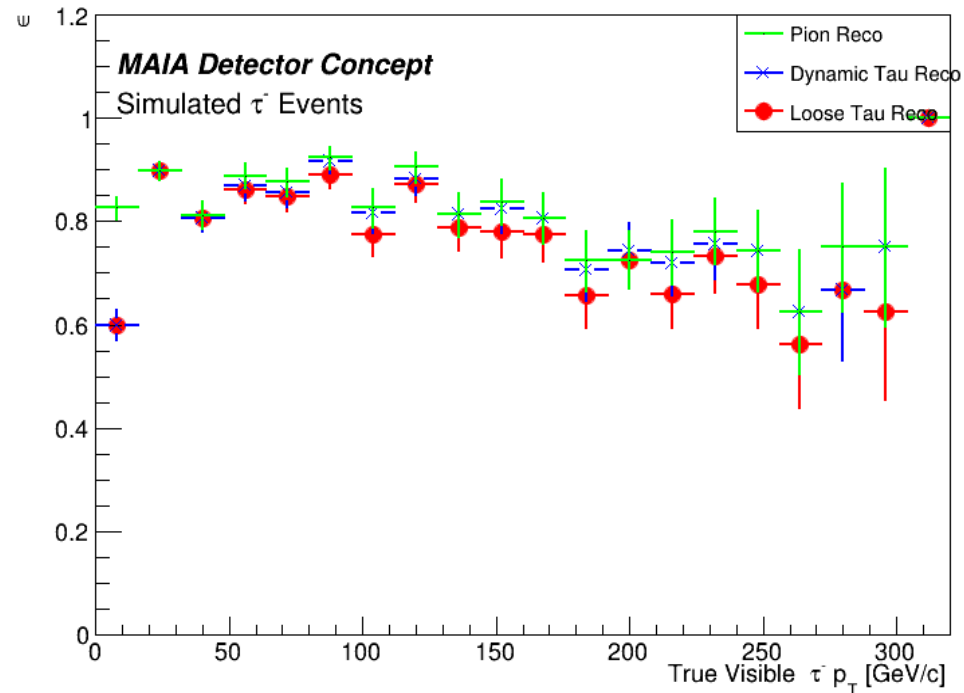- Search cone 0.05 → 0.1 rad

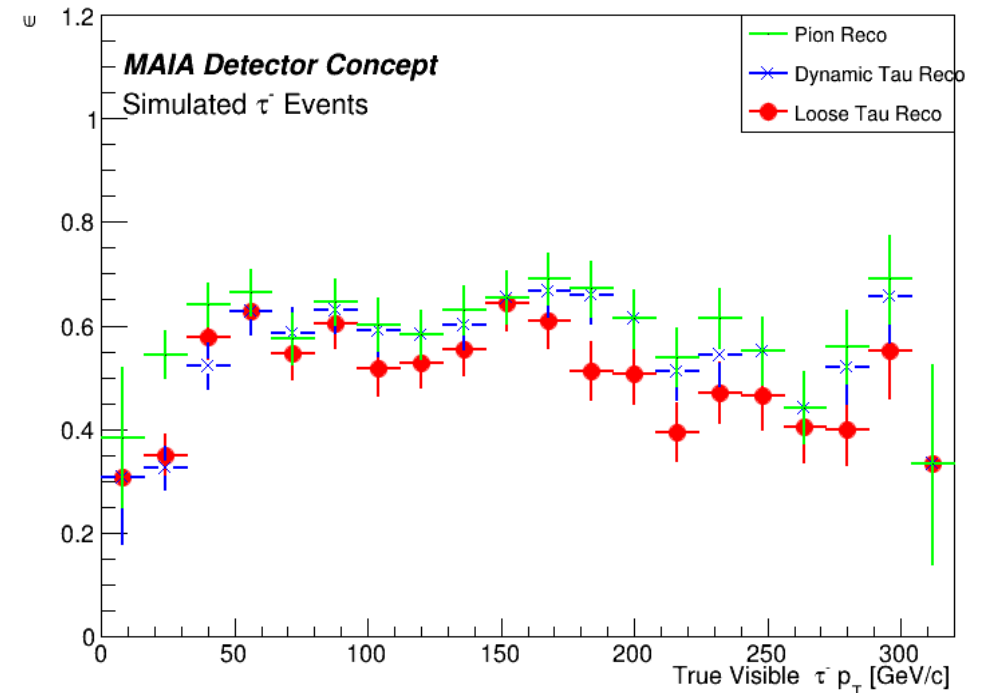Dynamic cone to improve loose attempt:

0.1: 0-20

2/pt: 20-40

0.05: 40->

1-Prong Reconstruction Efficiencies vs p_T

3-Prong Reconstruction Efficiencies vs p_T

- Universally better for 1-Prong and generally better for 3-Prong
- Ironically does worse in the area the function was applied for 3-Prong
- General improvements could be made for high pt and of course for low pt.

1-Prong Reconstruction Efficiencies vs p_T

3-Prong Reconstruction Efficiencies vs p_T
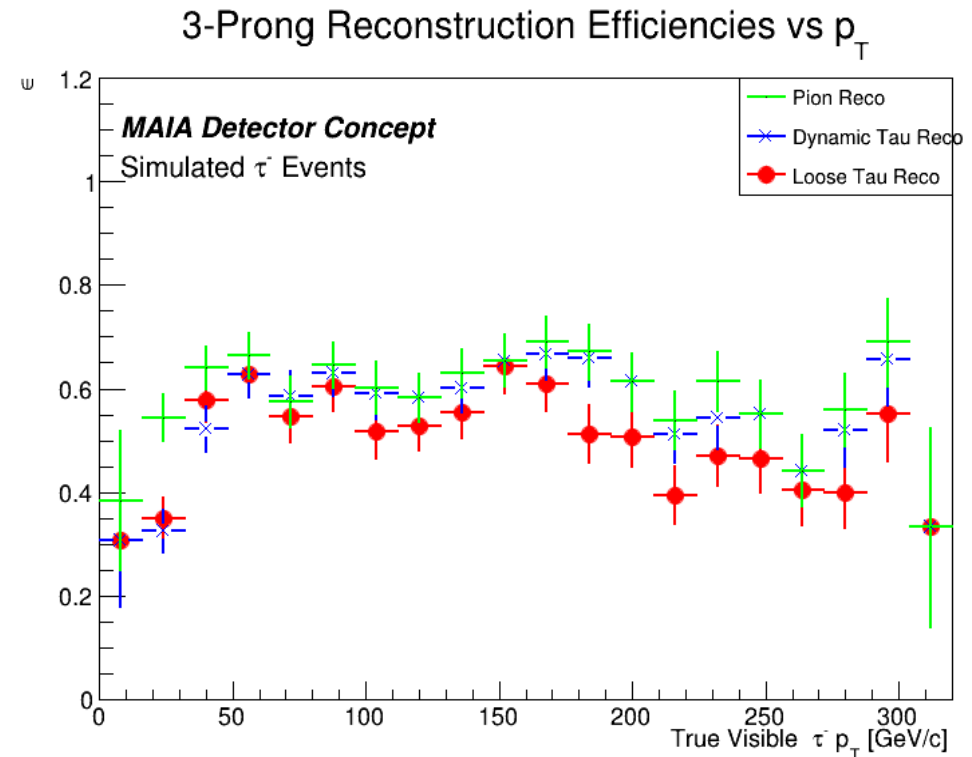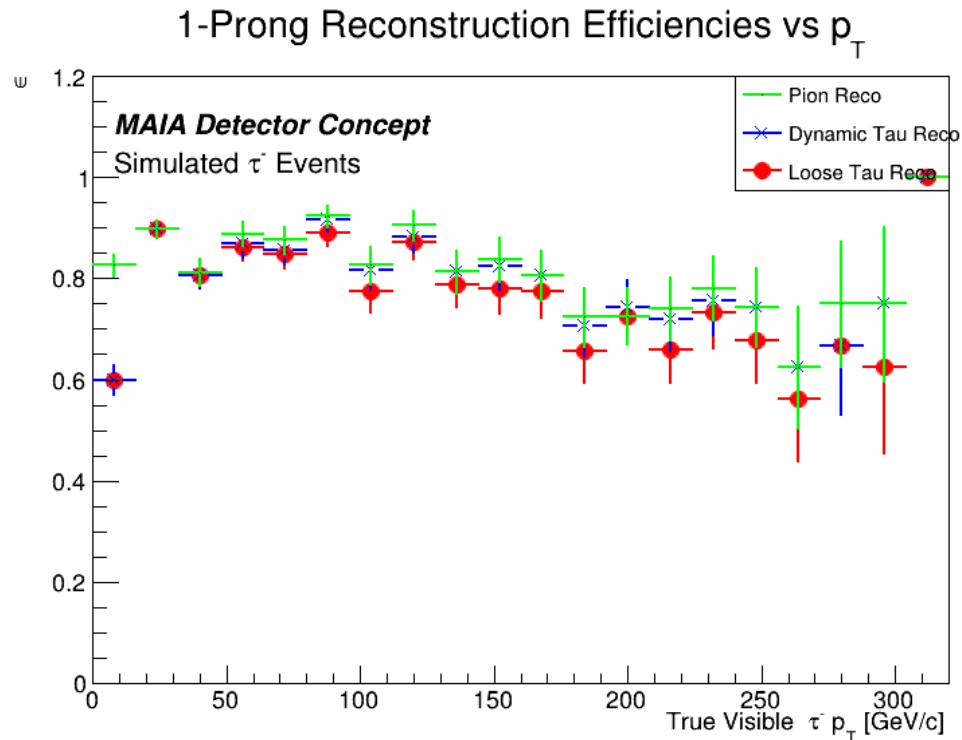
Testing many different static search cone arrangements revealed a *roughly* optimal path of:
0.2: <60
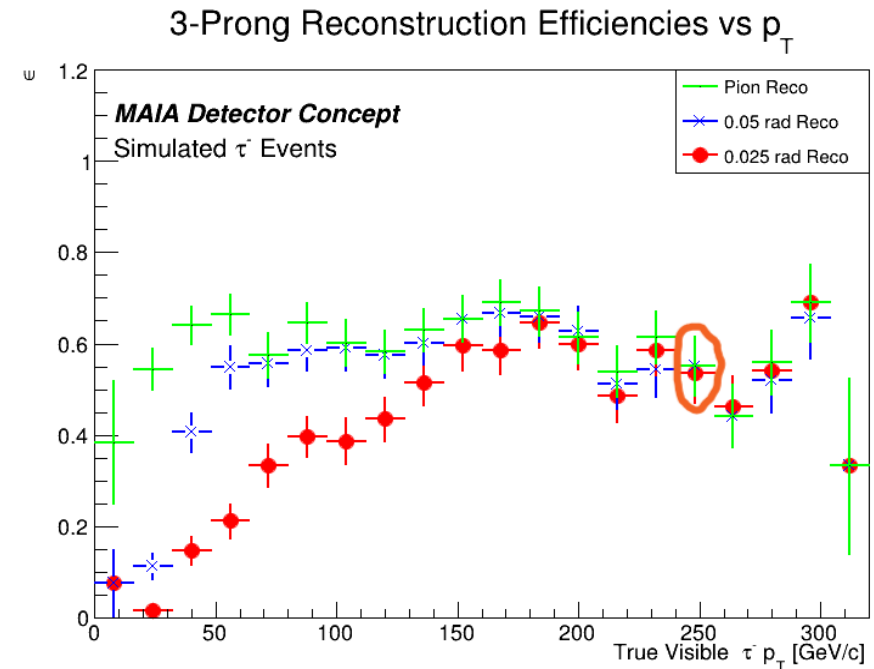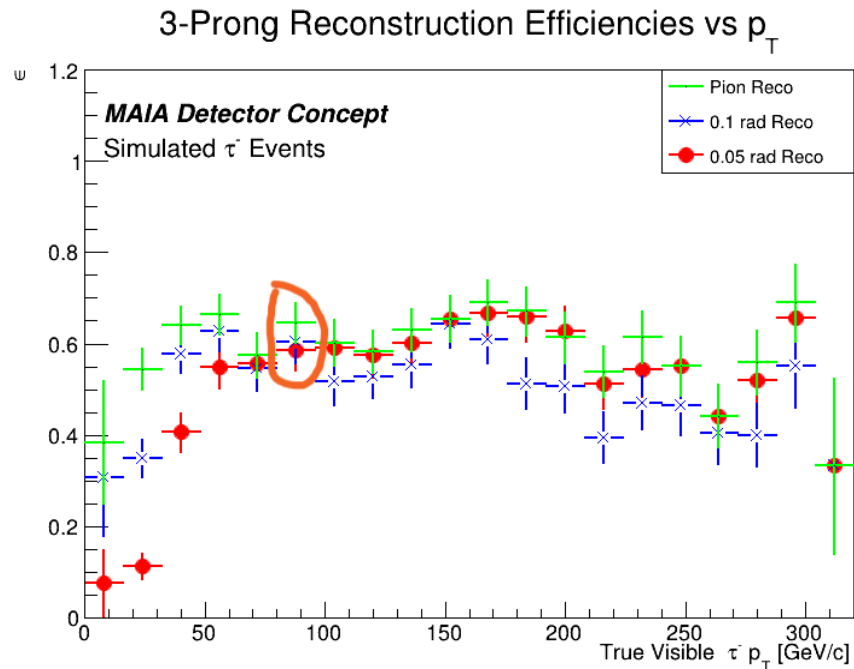0.1: 60-70
0.075: 70-130
0.05: 130-230
0.025: 230->

Always decreasing in the search cone angle is not always optimal throughout a section. A couple of times there were caveats to an angle's supremacy over another even if it initially it appears to be clear. Seems usually in the bucket right after it initially seems to look better.

From the results I found I make 3 new dynamic cones:
1. A piecewise function that switches between the static search cone angles
2. A polynomial function that goes through key angle switching points
3. A rational function that goes through key angle switching points

Piecewise Static
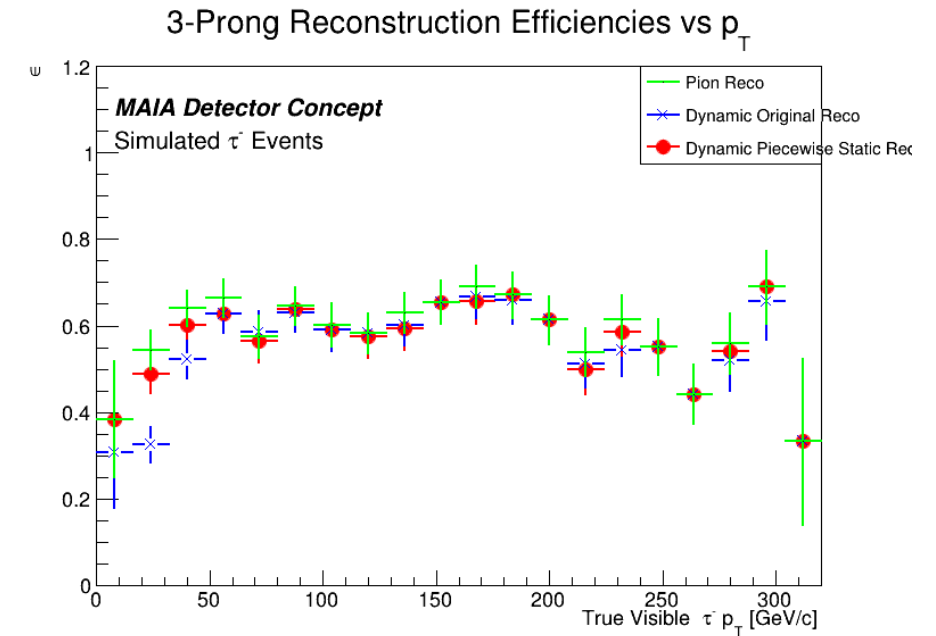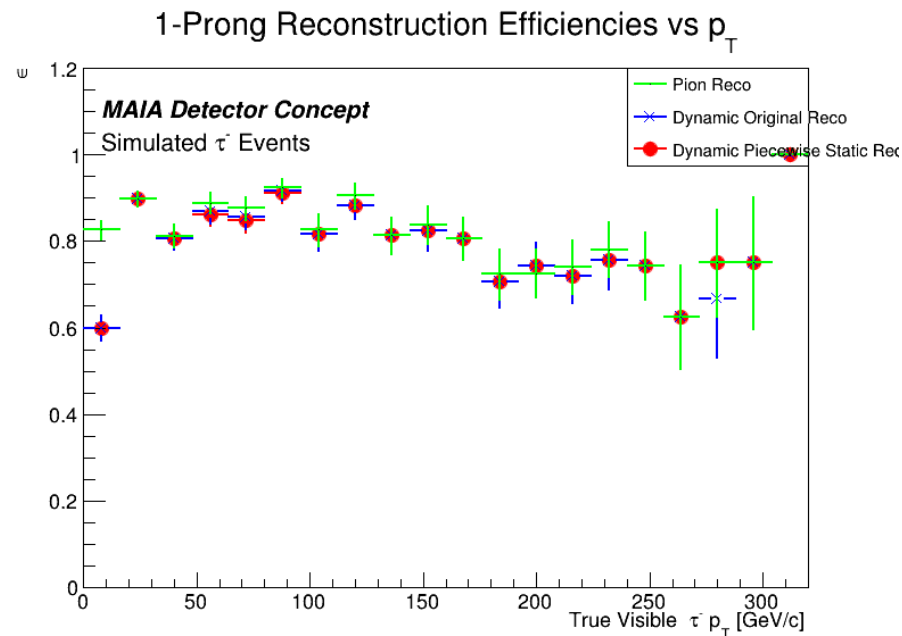
Universal Improvement for 1-Prong, some fall faltering in the mid-range. They should both be 0.05 there so not 100% sure why.

Polynomial

1-Prong Reconstruction Efficiencies vs p_T

3-Prong Reconstruction Efficiencies vs p_T
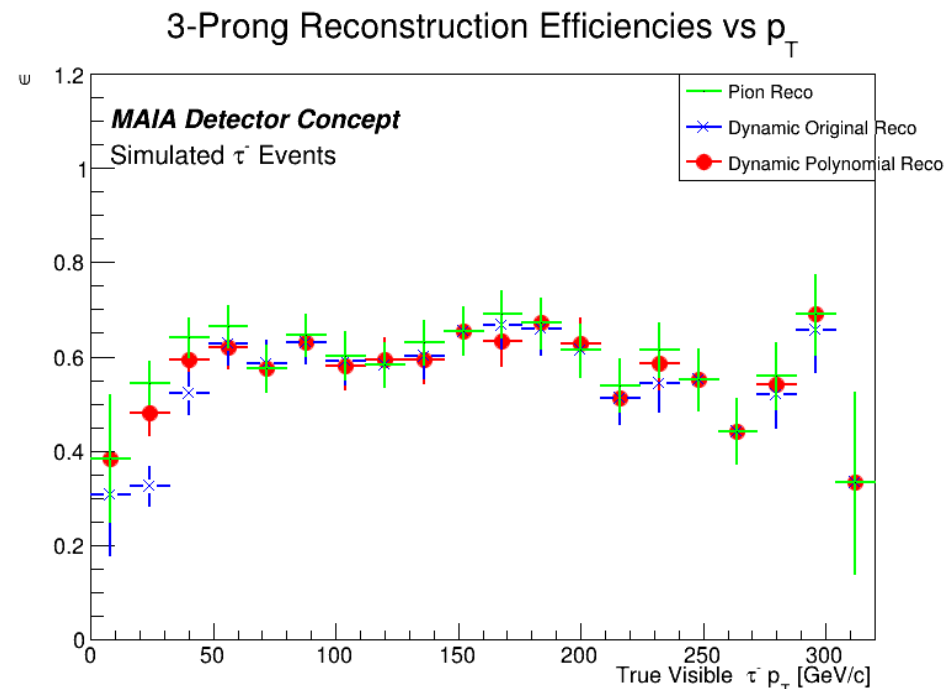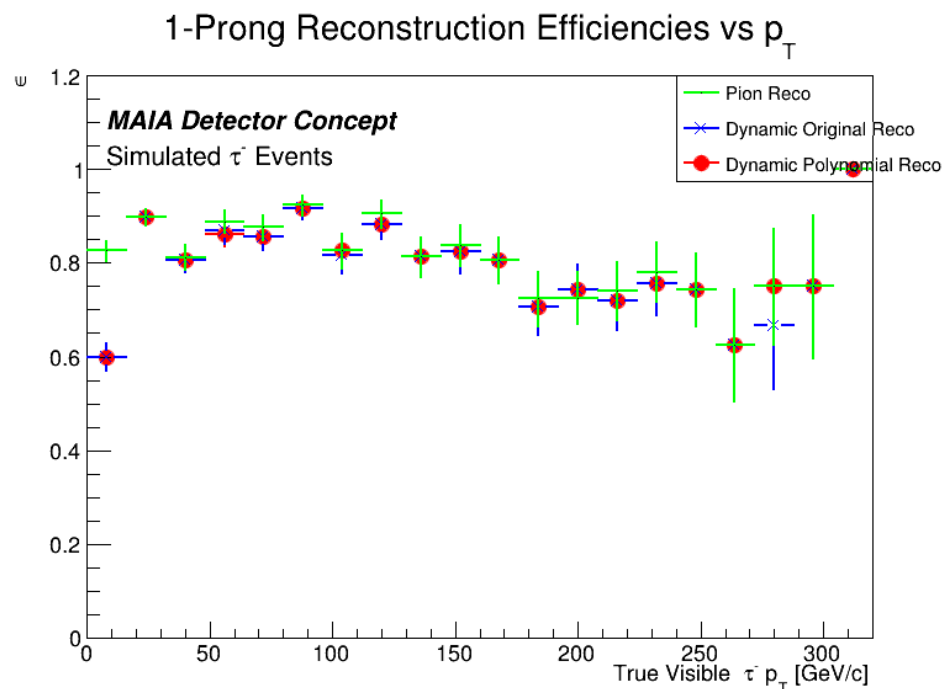
Both struggle around the transition point of 50 to mid-range, this is the most dynamic change the functions I plotted along. Generally better than the original dynamic except for those few points where a higher angle would have been preferred.

Rational

1-Prong Reconstruction Efficiencies vs p_T

3-Prong Reconstruction Efficiencies vs p_T
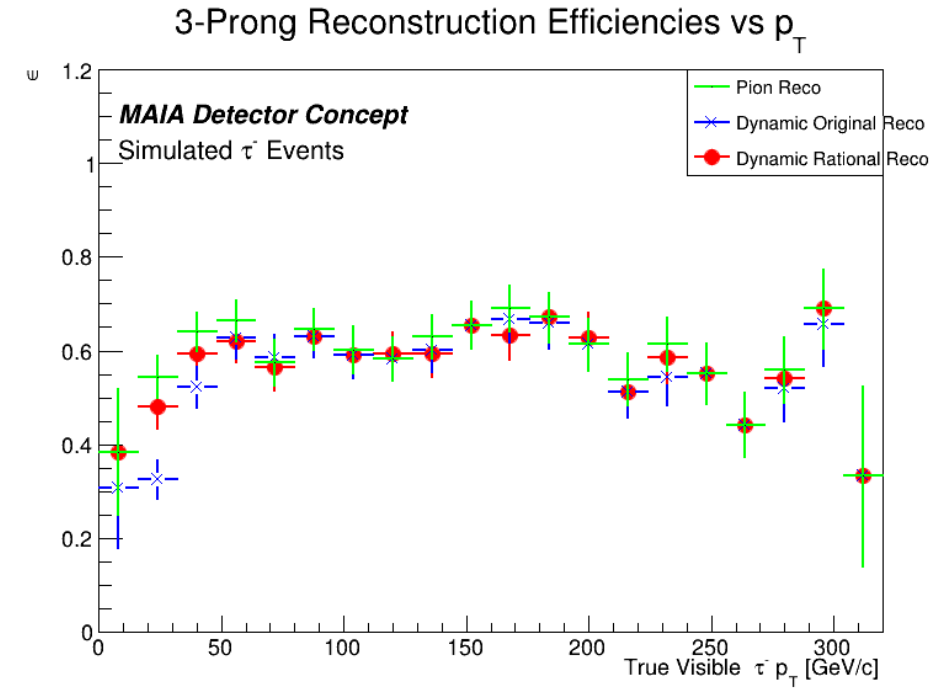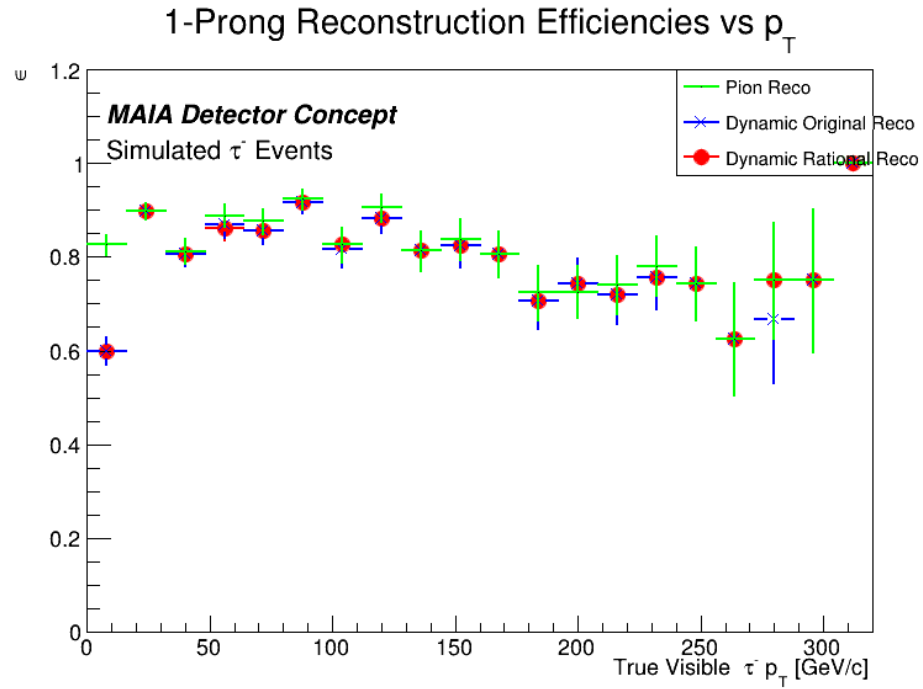
Nearly identical to the polynomial one and so similar observations

Maybe understandable graph that compares all three
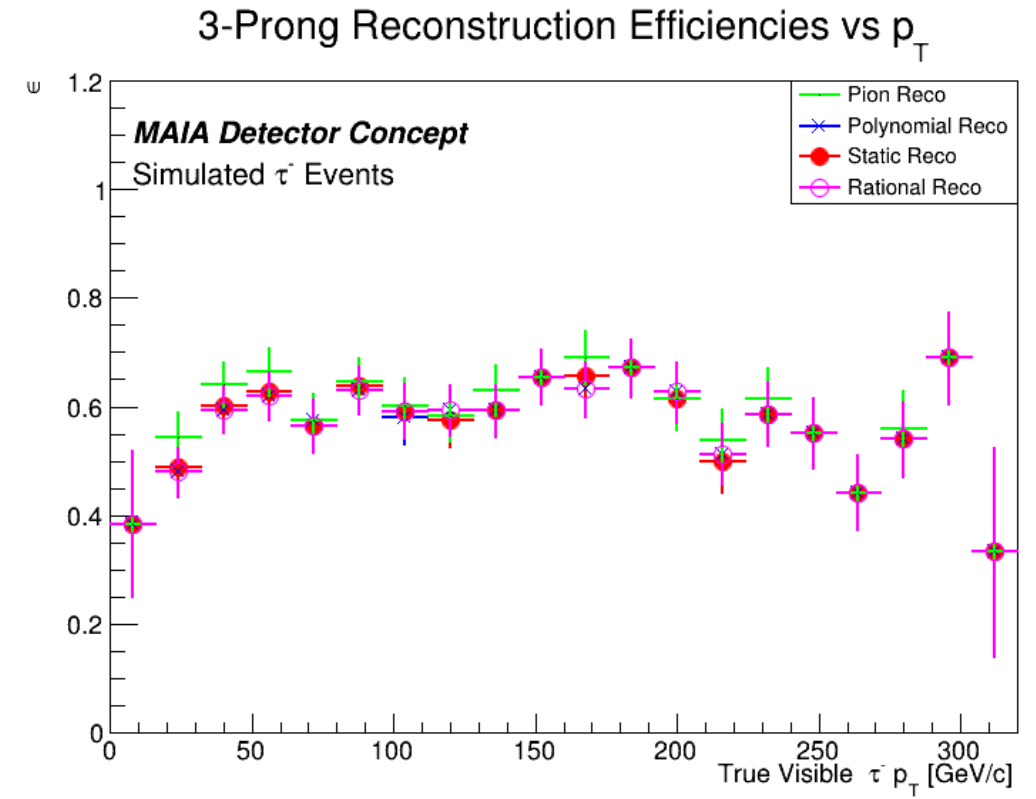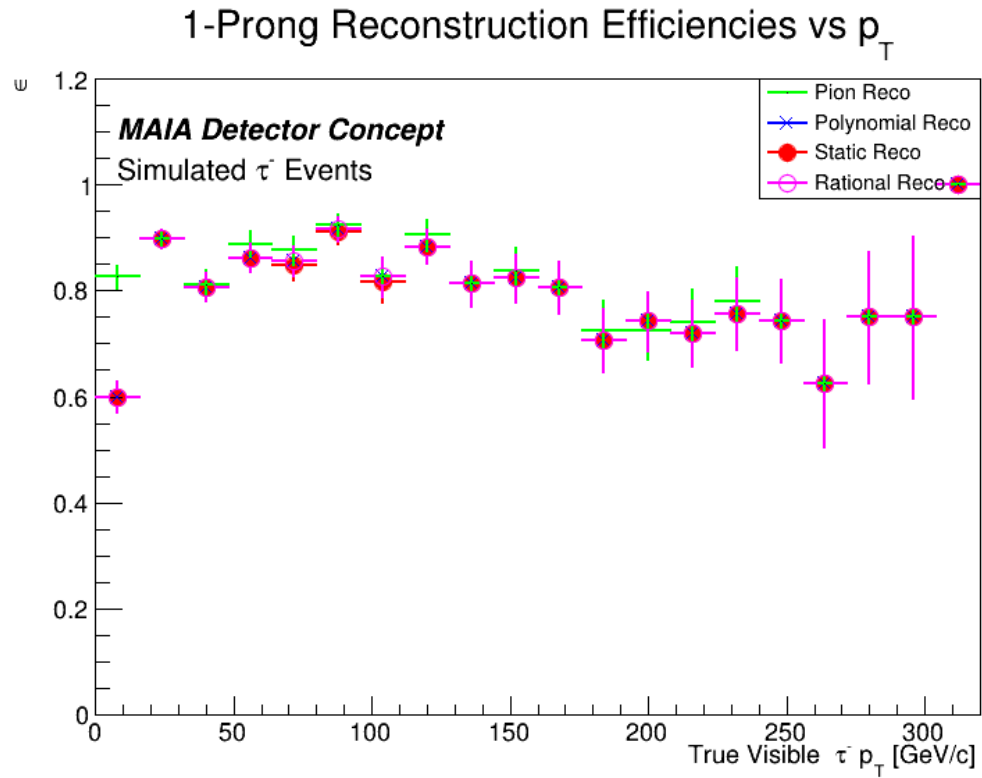
Sidenote: Occasionally you can get an efficiency higher than the Pion one, which is supposed to be the theoretical maximum. Not sure how to interpret it or if it's something to try to achieve.

3-Prong Reconstruction Efficiencies vs p_T