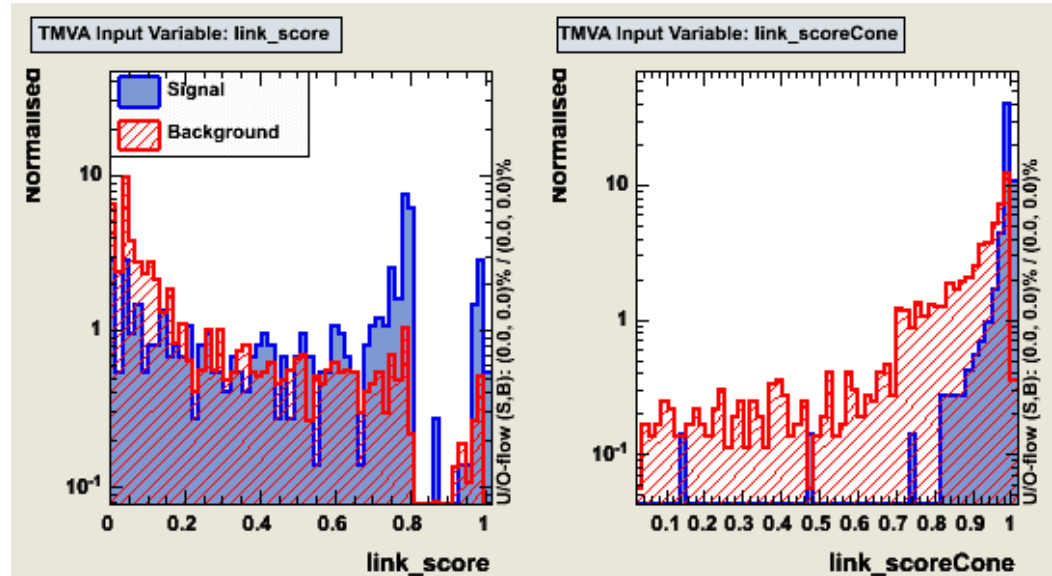# PFA studies

Remi Zaidan

The University of Iowa

Introduction: the problem.

The first cone is needed to allow the shower to develop deeper into the calorimeter.

However it's too strong: The only way for stopping the development from going too far is by the E/P constraint.

The E/P constraint needed for that effect is too tight...

The first cone algorithm is doing what it is supposed to do for signal but not for background

Introduction: The idea

- Relax the E/P requirement: up to 5 sigma's
- Try to apply the first cone in a less aggressive way: Don't modify the score, instead apply a cut on the score given by the cone algorithm.
- Allow sharing of clusters between tracks and resolve ambiguities based on the E/P balance and geometrical (cone) considerations.

Understanding the intermediate steps

Understanding the intermediate steps
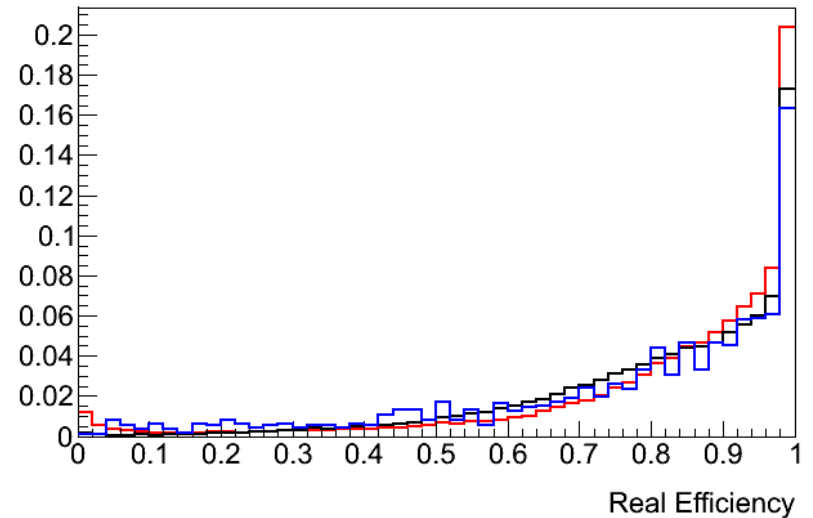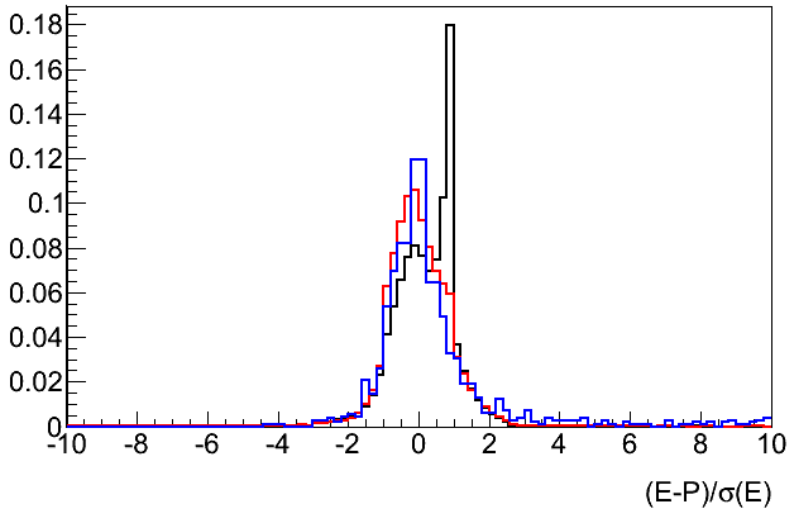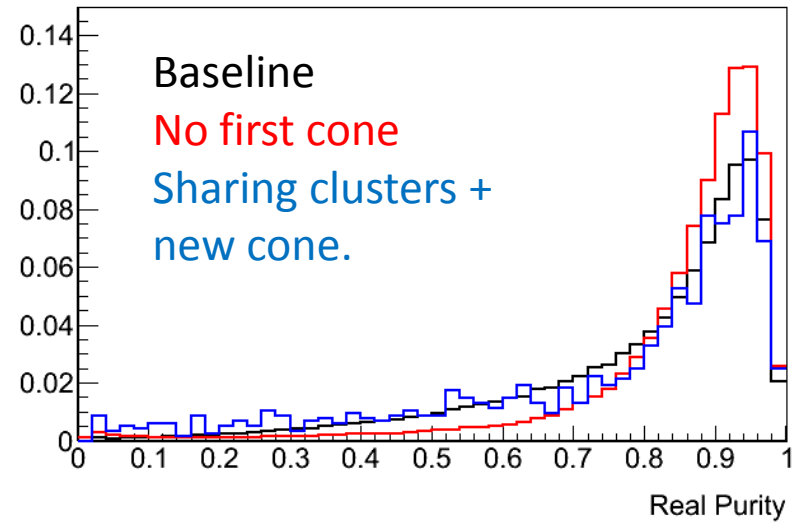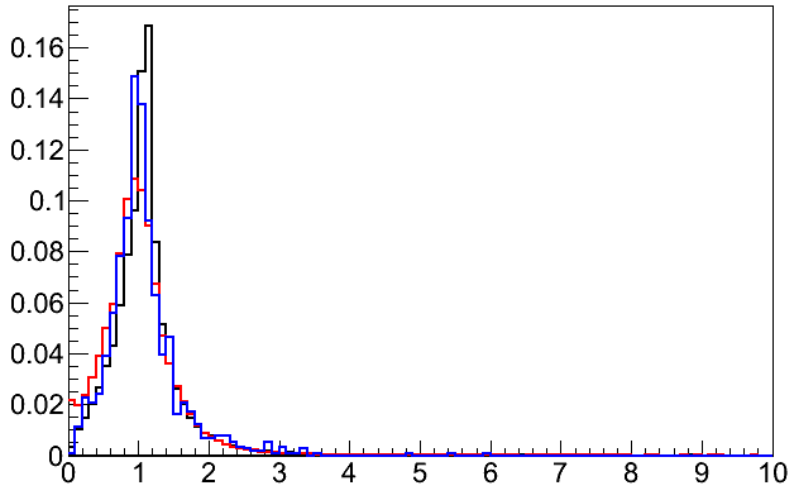
Baseline
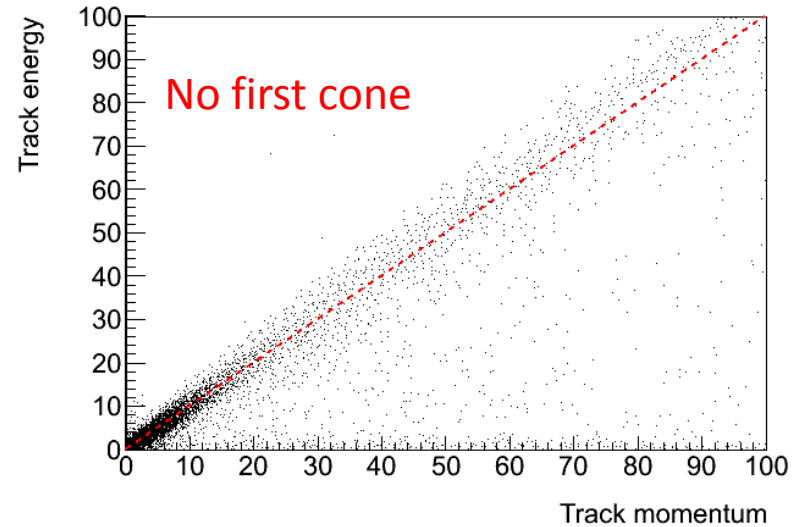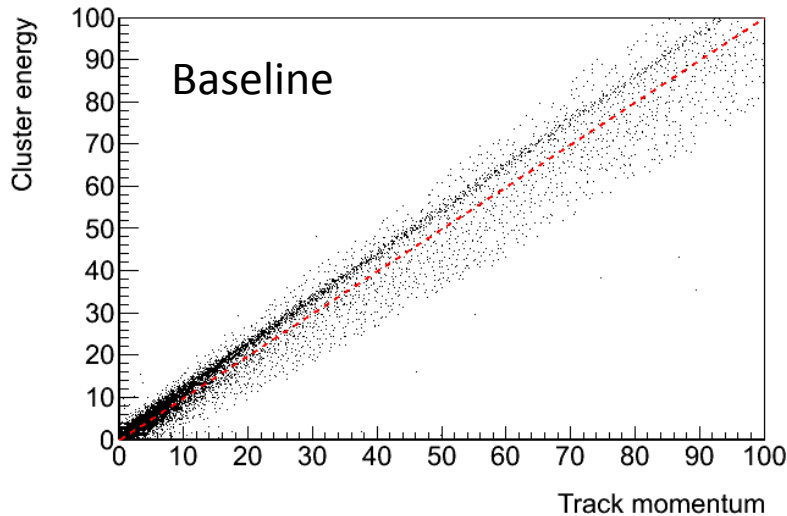
No first cone

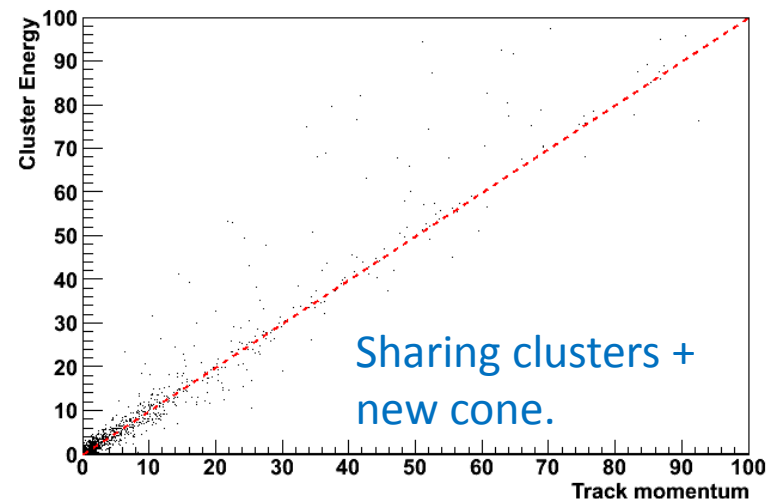- The baseline performance suffers from an artificial E/P constraint:

$$E \sim P + 1\,\sigma(E)$$

- Removing the first cone stop showers from developing:

$$E << P$$

- Relaxing the E/P constraint, showers tend to over-develop:

$$E >> P$$

Sharing clusters + new cone.

Conclusion

- Need an independent way than the E/P constrain to separate charged from neutral energy.

- Need to be able to quantify the amount of charged/neutral confusion.