

Validation of FCal Simulation for Run 3

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Introduction - Samples

- Geant4 - G4, full simulation of interaction of particles with matter
- Geant4 - G4 with frozen shower, full simulation using a library for standard showers in the forward region
- AF, Atlas Fast Simulation approximating showers.

Introduction - Features

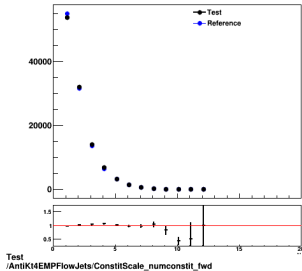
- Forward region: $3.1 < |\eta| < 4.9$
- Standard kinematic features for the forward region at EMScale and ConstitScale
- Plotting kinematics in additional eta and pt bins
- Number of constituents in the forward region at EMScale and ConstitScale
- Energy response in the forward region
- Average number of jets
- +standard plots for jet validation

Introduction - Comparisons

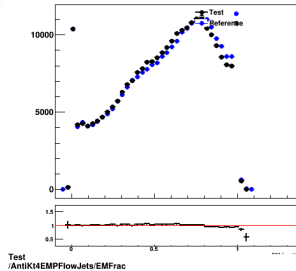
- Comparisons produced using the usual scripts for jet validation.
- Comparison of G4 to G4 with frozen shower: [Plots](#)
- Comparison of AF to G4 with frozen shower: [Plots](#)
- Comparison of AF to G4 without frozen shower: [Plots](#)

G4 to G4 with frozen shower

Number of constituents forward Jet (ConstitScale)



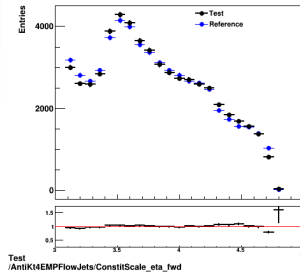
EM Fraction



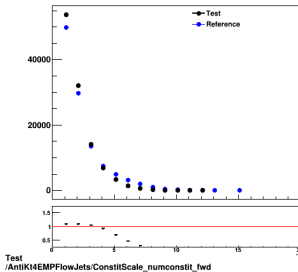
- Good agreement between G4 and G4 without frozen shower
- Number of constituents and kinematics look good
- Shape differences for the EMFrac

AF to G4 with frozen shower

Forward Jet η (ConsttScale)

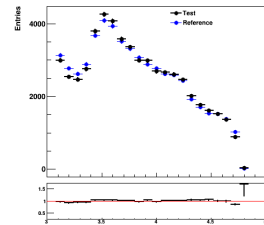


Number of constituents forward Jet (ConsttScale)

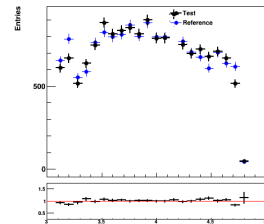


- A few plots are marked red. Nothing shows large disagreements.
- Kinematics have acceptable agreement.

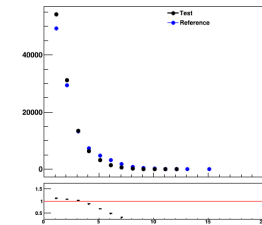
AF to G4 without frozen shower, red plots

Forward Jet η (ConstitScale)

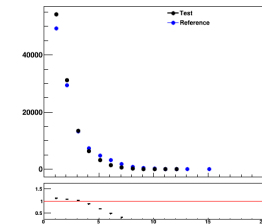
Test
/AntiK1EMPFJwJets/ConstitScale_eta_fwd

Forward Jet η (20000<pt<40000)

Test
/AntiK1EMPFJwJets/eta_fwdsel_20000_pt_int_40000

Number of constituents forward Jet (EMScale)

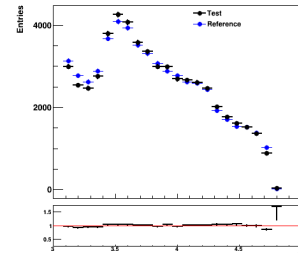
Test
/AntiK1EMPFJwJets/EMScale_numconstit_fwd

Number of constituents forward Jet (ConstitScale)

Test
/AntiK1EMPFJwJets/ConstitScale_numconstit_fwd

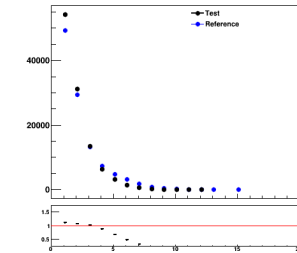
AF to G4 without frozen shower, decent agreement

Forward Jet η (ConstitScale)



Test
/AntiK4EMPFJet/ConstitScale_eta_fwd

Number of constituents forward Jet (EMScale)



Test
/AntiK4EMPFJet/EMScale_numconstit_fwd

- The number of constituents in the forward region is slightly off but the kinematics look ok