



Flavour-by-flavour event comparison

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Kinematics

- The kinematics of neutrino deep inelastic scattering events is dictated by the values of the Bjorken scaling parameters
 - Bjorken-x: elasticity parameter (x = 1.0 fully elastic)
 - Bjorken-y: fractional energy transfer to nucleon
- Since we are interested in the corresponding detector response, we define two additional 'visible' kinematic variables:
 - 1. Visible energy
 - Length-integrated energy loss for muons
 - Total (kinetic) energy for photons / electrons / neutral pions
 - EM-equivalent energy for charged pions and other mesons / hadrons
 - 2. Transverse visible energy
 - Visible energy projected unto transverse direction



Transverse visible energy





- Transverse visible energy generally small
 - In the lab frame, defined by the Fermi motion of the parton

• For \mathbf{v}_{τ} more or less constant as a function of neutrino energy

Transverse visible energy w.r.t neutrino direction



- Normalized over each bin in E_v (to make E_v-dependence clearer)
- More or less constant behaviour as function of E_v for v_e and v_{μ}
 - Slightly more contributions towards high $E_{vis,T}$ at high E_v due to more energetic hadronic final state
- For v_{τ} higher $E_{vis,T}$ at very low E_{v} , due to the τ -lepton decaying at nearrest

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3. Principal track direction

• Visible-energy-weighted mean of track directions

Vist

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Transverse visible energy w.r.t principal track direction



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- More or less same behaviour visible when defining Evis,T w.r.t. principal track direction



KM3NeT

Number of final state hadrons



- For $B_y < 0.2 \mod v_e$ and v_{μ} -CC interactions yield 1 or 2 hadrons maximum
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