Jet energy calibration with gamma+jet events

Status Report
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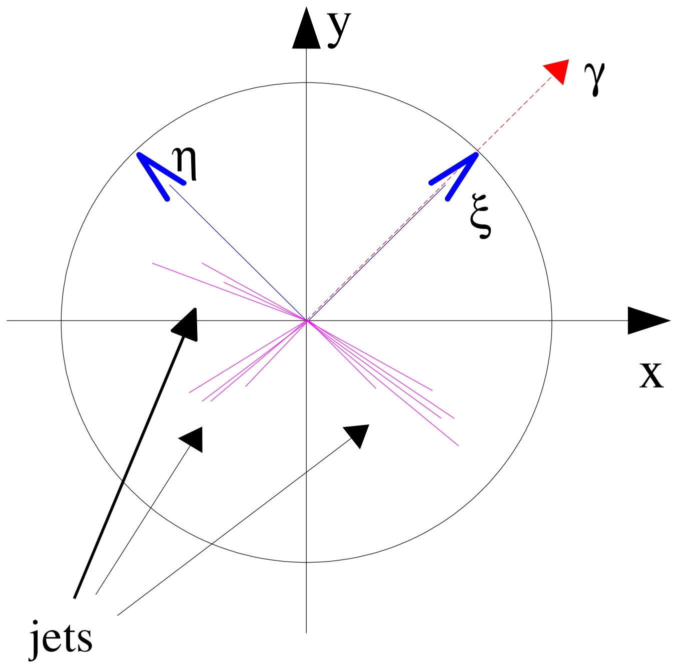
Method overview

- Idea: Balance p_t of photons against jets
  - Relies on good em-scale
- Start with fixed algorithm (cone 0.7)
- Objects:
  - em clusters 1.0
  - jets α_{jet}
  - Unclustered energy α_{ue}
    (underlying event, pile-up etc.)

- Goals:
  - jet energy scale from p_t-balance (α_{jet})
  - optimize $p_{t,miss}$ resolution (α_{ue})



Projections

- View everything in the transverse plane
- Project all jets on the photon direction and transverse to it
- Minimize:

$$\chi_1^2 = \sum_{i=1}^{N_{event}} \left(E_\gamma - \sum_{k=1}^{N_{jet}} f_{layer}\,\alpha_{jet}(E,\eta)\,E_\xi(jet_k) - \alpha_{ue} E_{ue}\right)^2 / \sigma_{jet}^2$$

$$\chi_2^2 = \left(\sum_{k=1}^{N_{jet}} \alpha_{jet}(E_T,\eta)\,E_\eta + \sum_{l=1}^{N_c} \alpha_{ue}(E)\,E_\eta^c\right)^2 / \sigma_{jet}^2$$

- Nest step: Fit transverse component
- MC samples: γ+jet with p_t>30,50,100 GeV

Strategy

1. Determine $\alpha_{jet}(E_t,\eta)$ ✓
   $\alpha_{UE}=1$
2. Release layer weights ✓
3. Release α_{UE} ✓
4. Study underlying event => α_{UE} (E), $\mathcal{L}$
5. Optimize $p_{t,miss}$ resolution
6. Apply method to b-jets
7. Test method with Z->qqbar

Jet resolution

E \ sigma/E	#1	#2	#3
15	0,150	0,150	0,150
45	0,100	0,100	0,100
75	0,090	0,090	0,089
105	0,080	0,074	0,075
135	0,060	0,068	0,065

#1	Layer weights fixed, UE fixed
#2	Layer weights free, UE fixed
#3	Layer weights and UE free