Gamma-Jet Balance in HERWIG and PYTHIA

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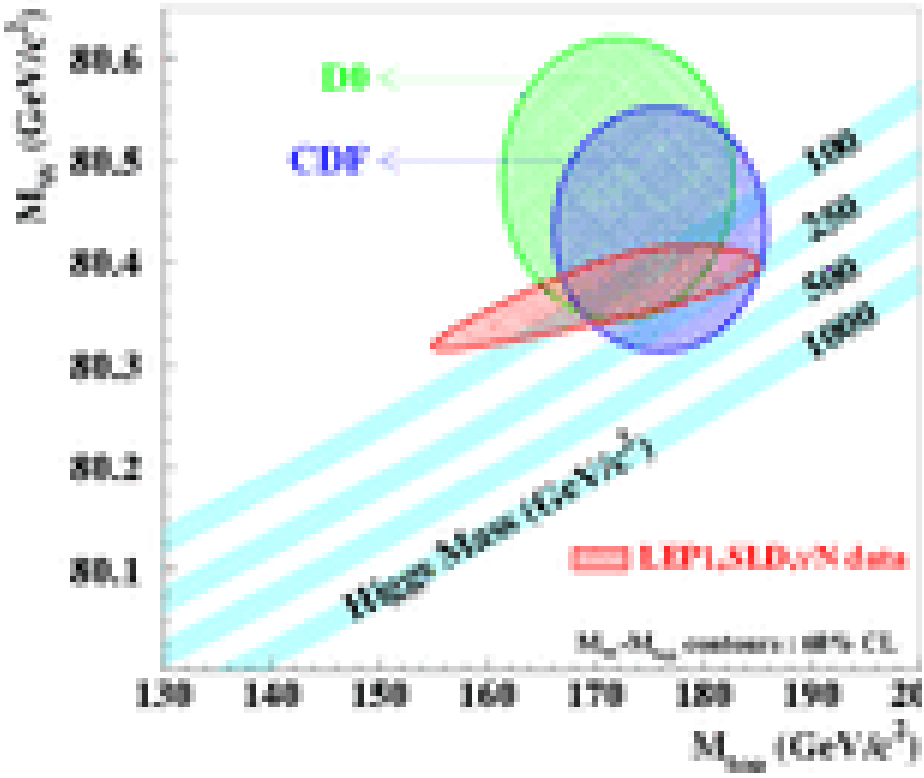
Top mass and W mass

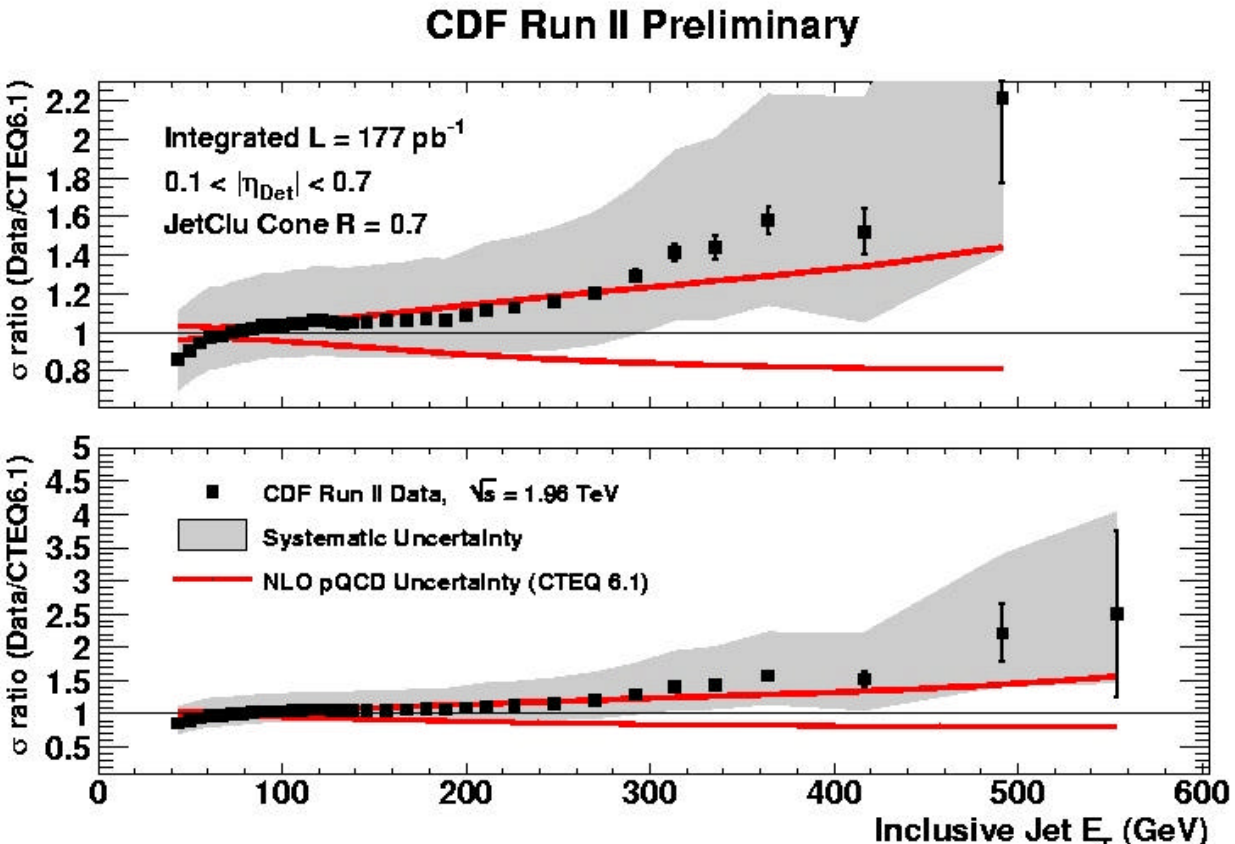
- M_W **?** m_t^2 and $\ln(M_H)$
- Error on M_W and m_t constrains M_H
- Expect light SM Higgs ~ 100 GeV



Current Error

M_W = 80.473 ± 0.065 (stat) ± 0.092 (syst) GeV

m_t = 176.1 ± 5.1 (stat) ± 5.3 (syst) GeV

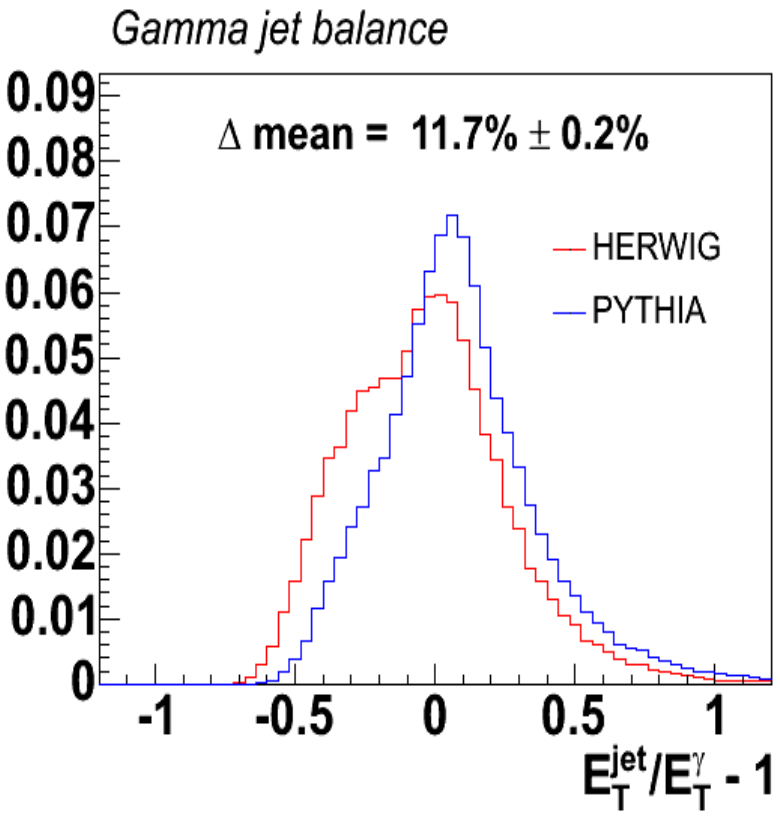


Jet Energy Resolution

- Absolute - gamma-jet balancing /cal. calib.
- Relative - di-jet balancing
- UE & UEM - minimum bias events
- OC - MC jet simulation

Gamma-Jet studies

- HERWIG and PYTHIA (CDF - 4%)
- ppbar at vs = 1.96 TeV
- Kt Jet Clustering Algorithm
- With/without UE and ISR



Generator Level Selection

> 50,000 events

Gamma η < 1

Gamma Pt > 23 GeV

Jet Pt > 5 GeV

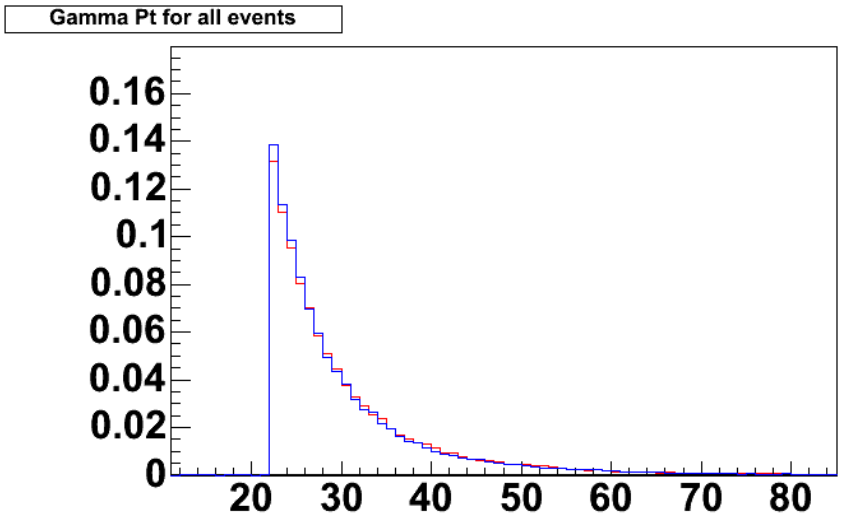


Diagram Branching ratios

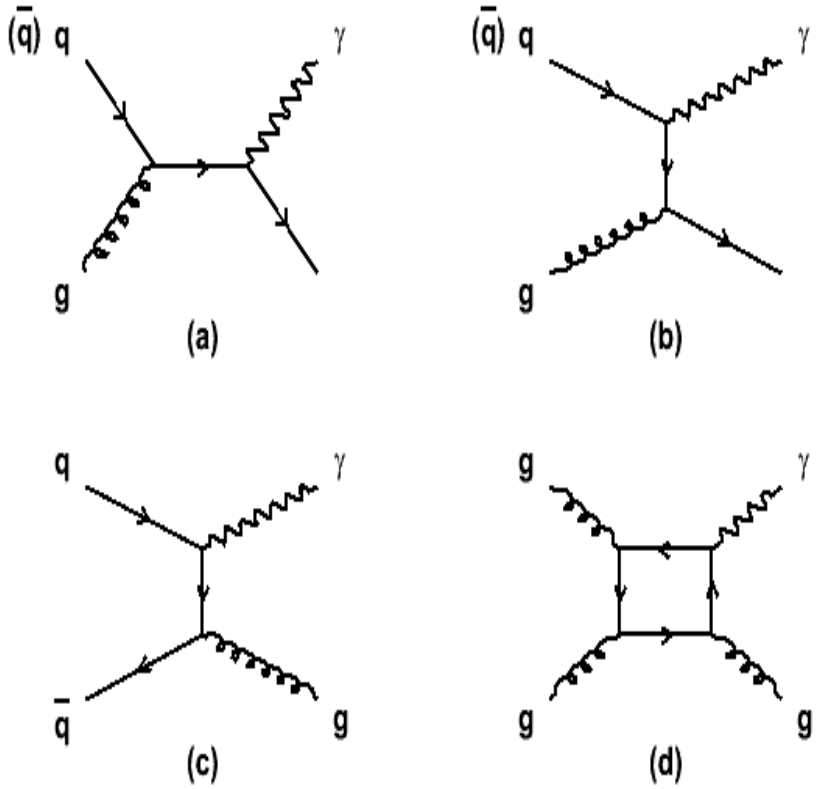


Fig.	HER	PYT	error
(a) (b)	85.6	85.7	0.2
(c)	14.4	14.3	0.1
(d)	0.038	0.031	0.005

Adjusted Generator Parameters

HERWIG

Prsof = 0

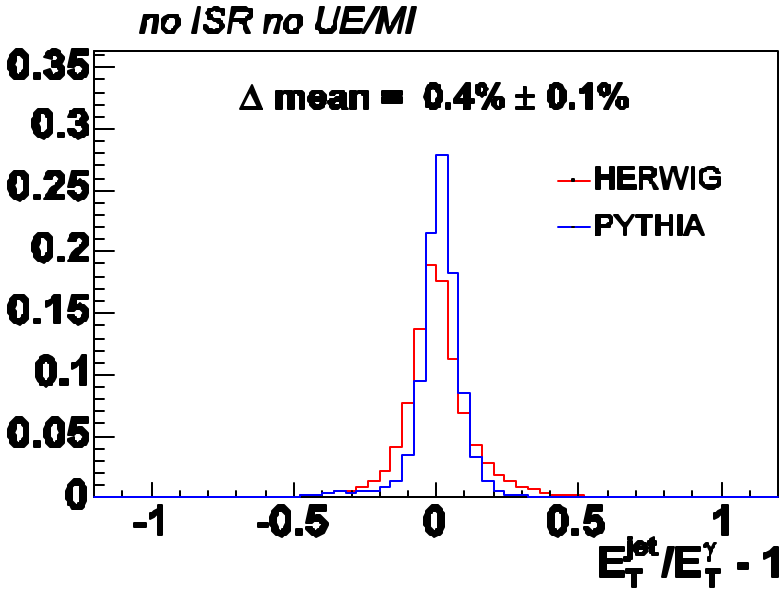
Nospac = 1

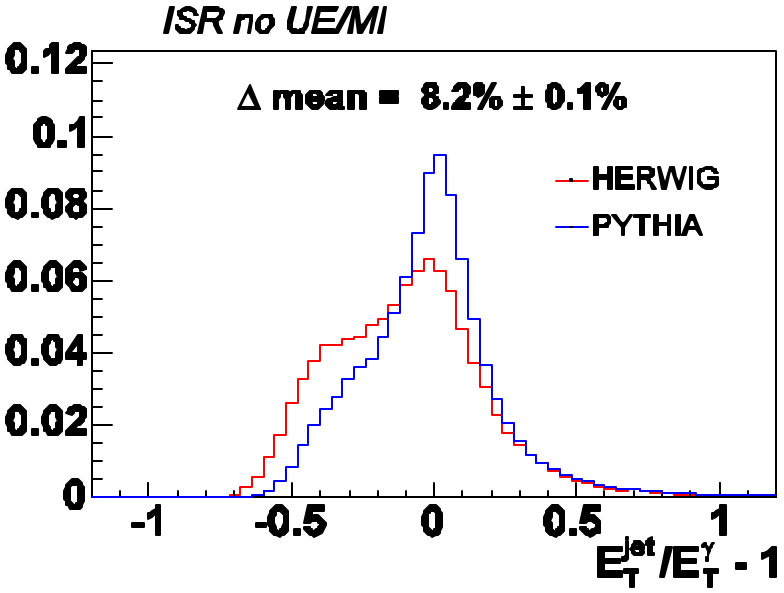
PYTHIA

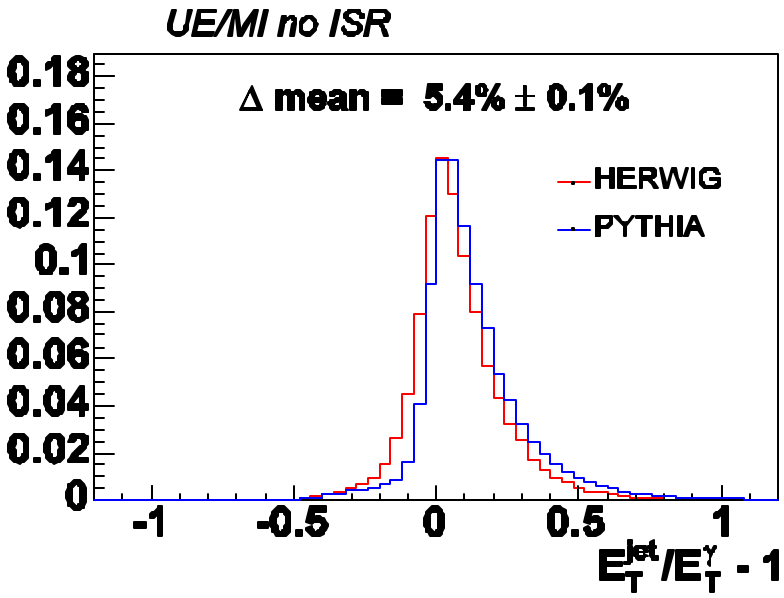
MSTP(81) = 0

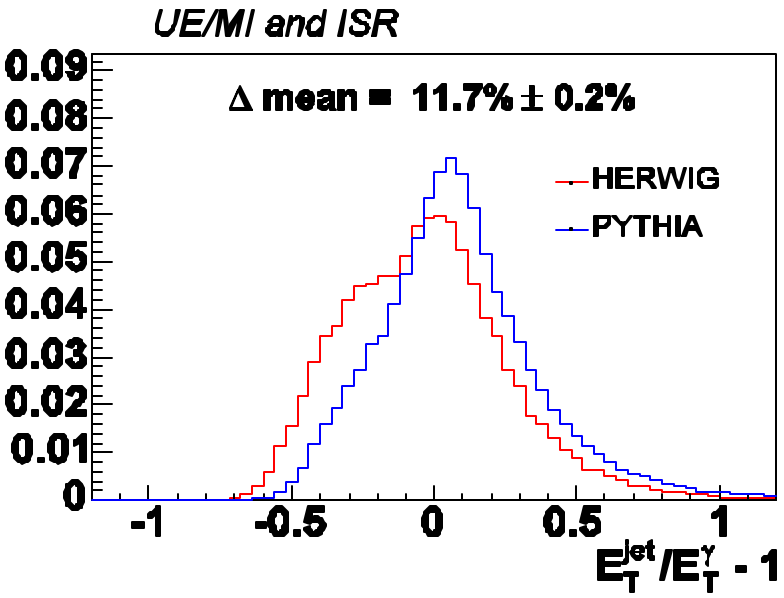
MSTP(61) = 0

Gamma jet ratio for all events

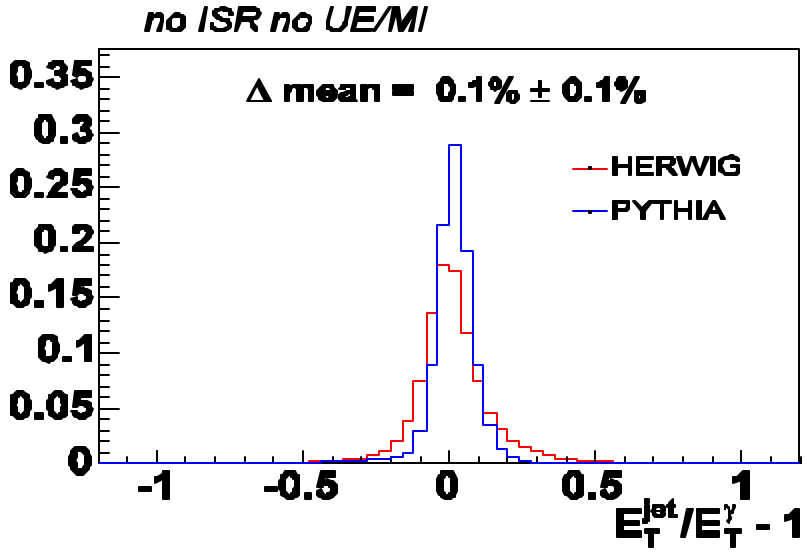


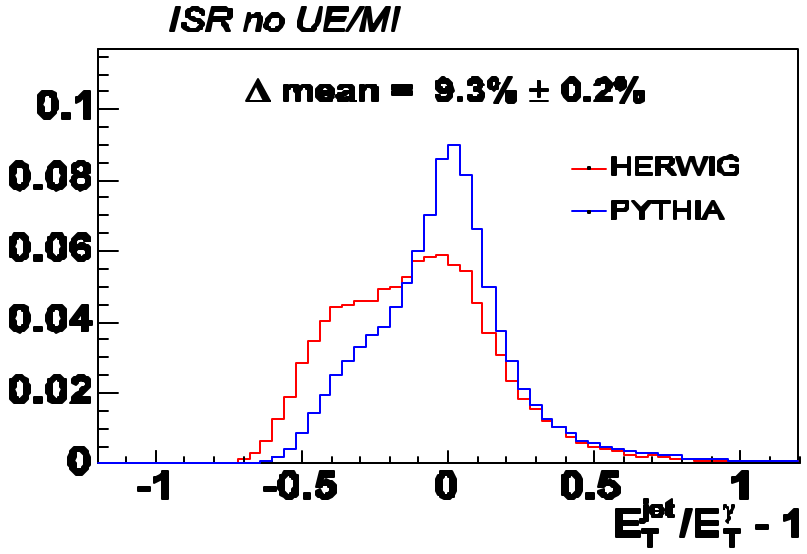


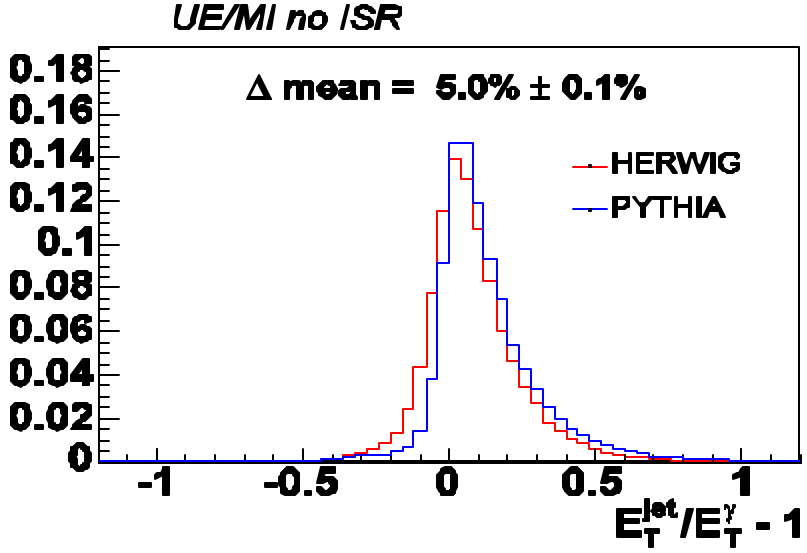


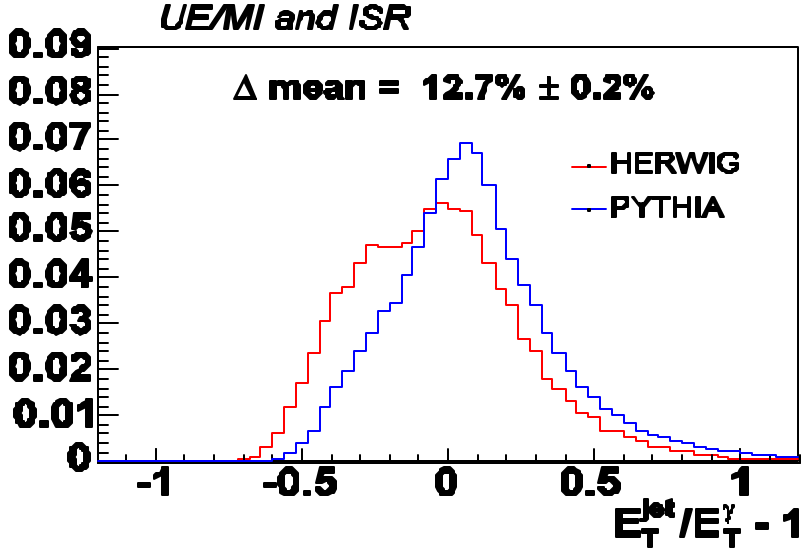


Gamma jet ratio for quark initiated jets

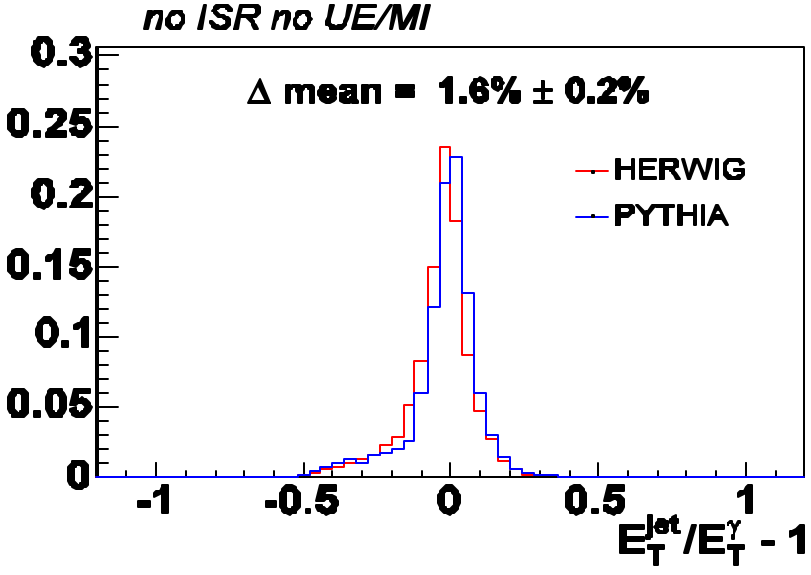


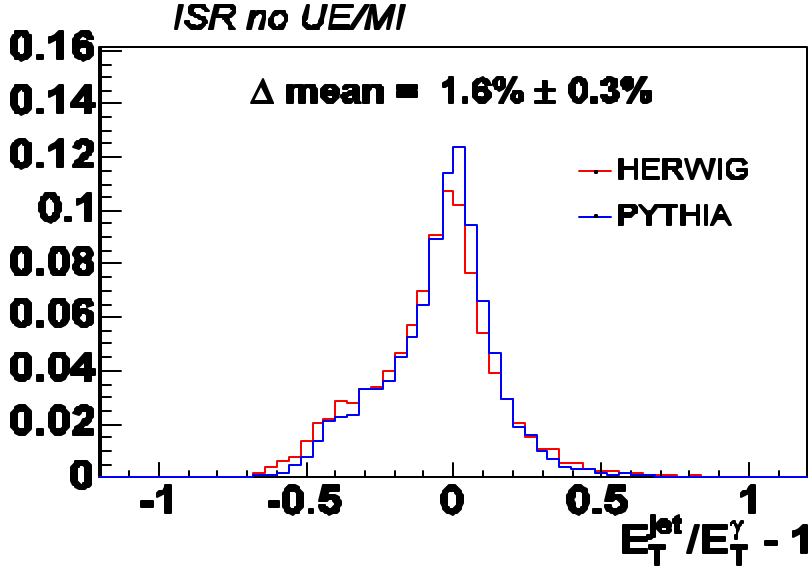


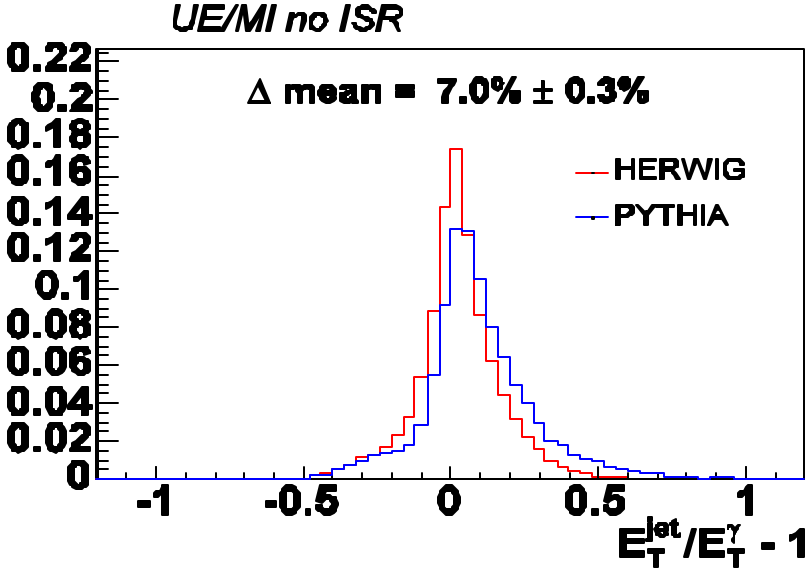


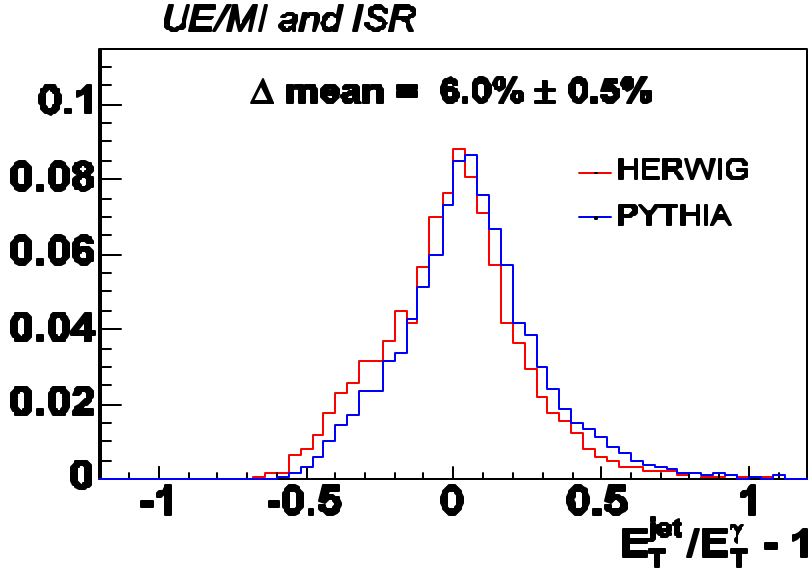


Gamma jet ratio for gluon initiated jets

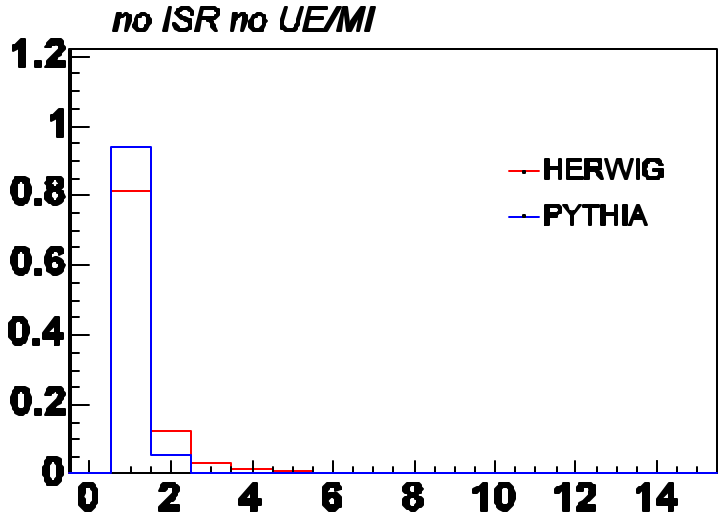


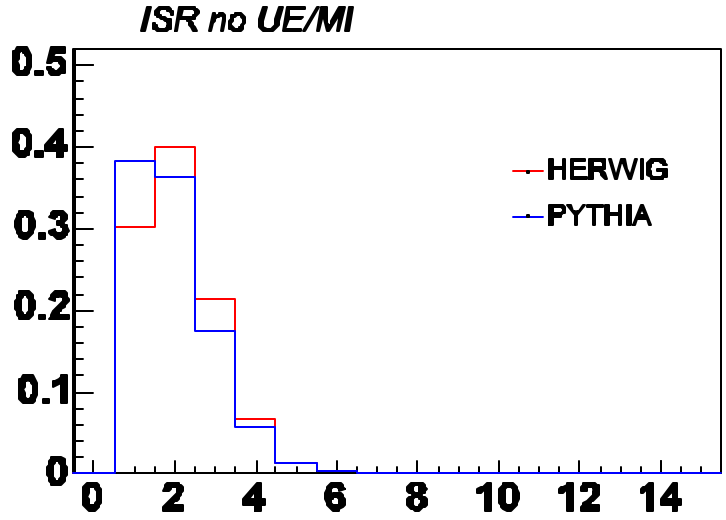


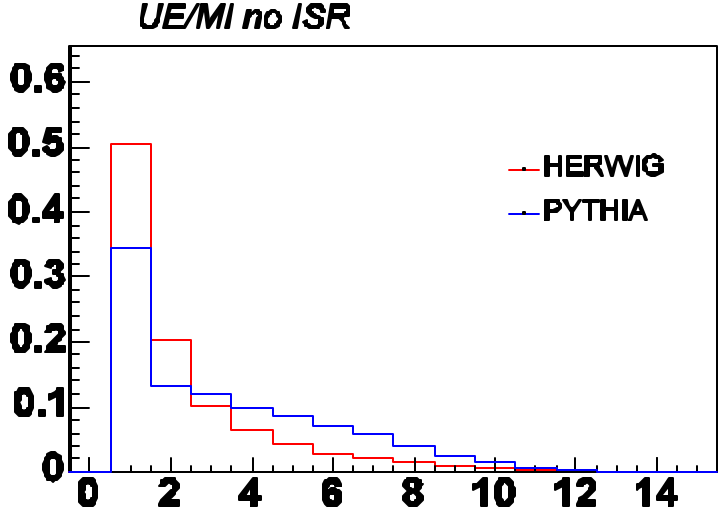


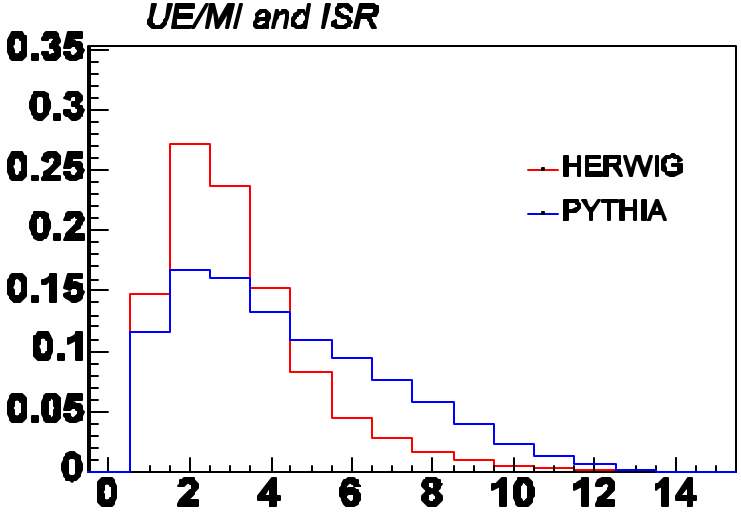


Number of jets (jet E_T cut = 5 GeV) for all events

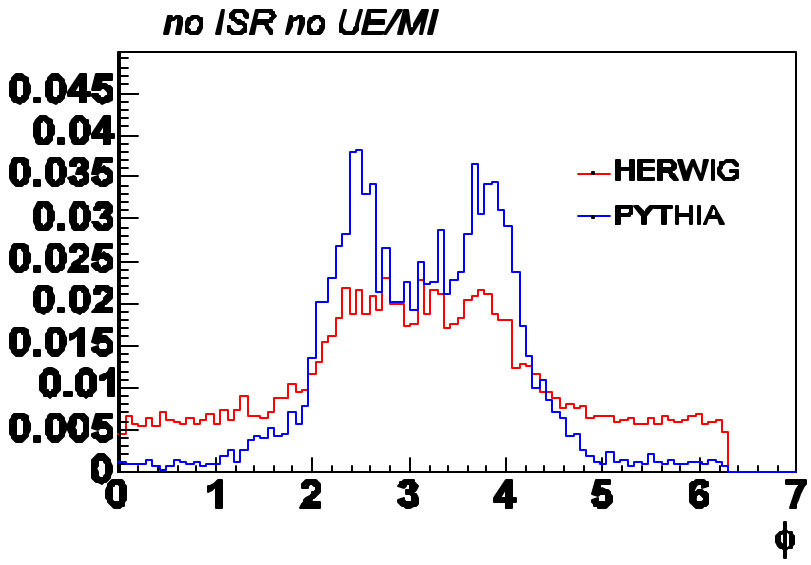


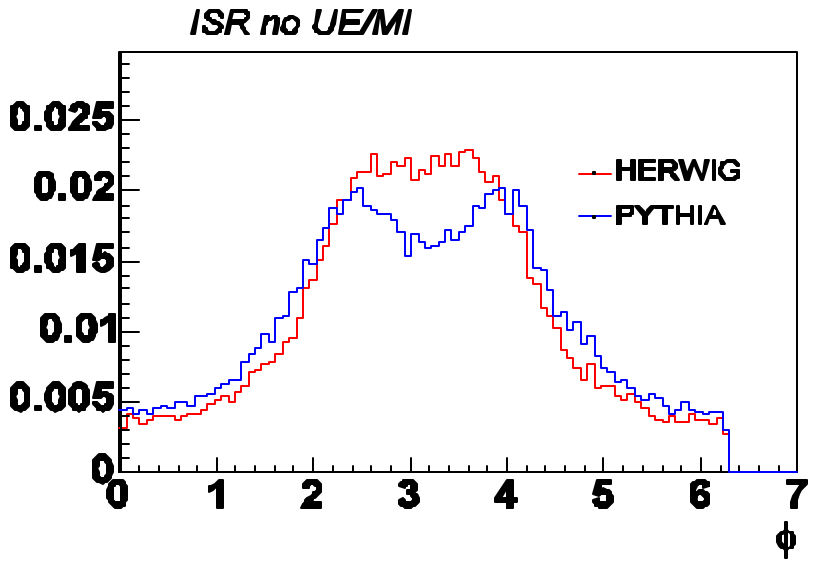


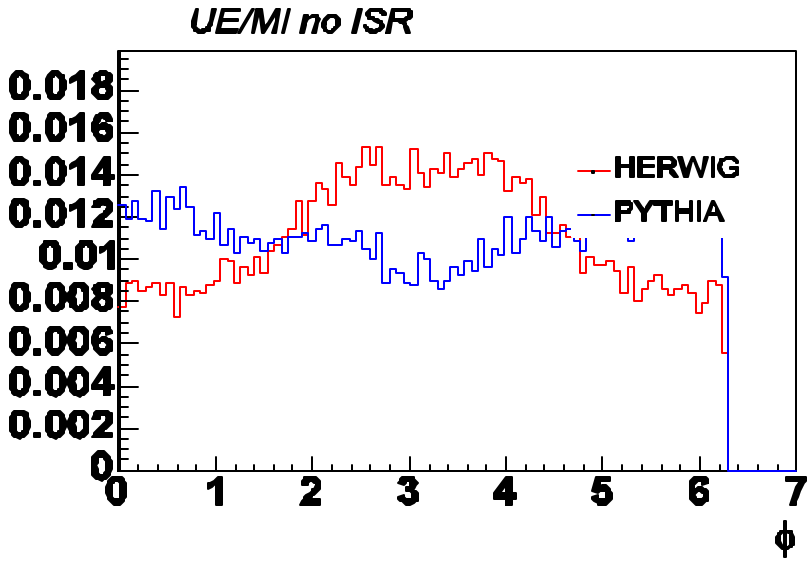


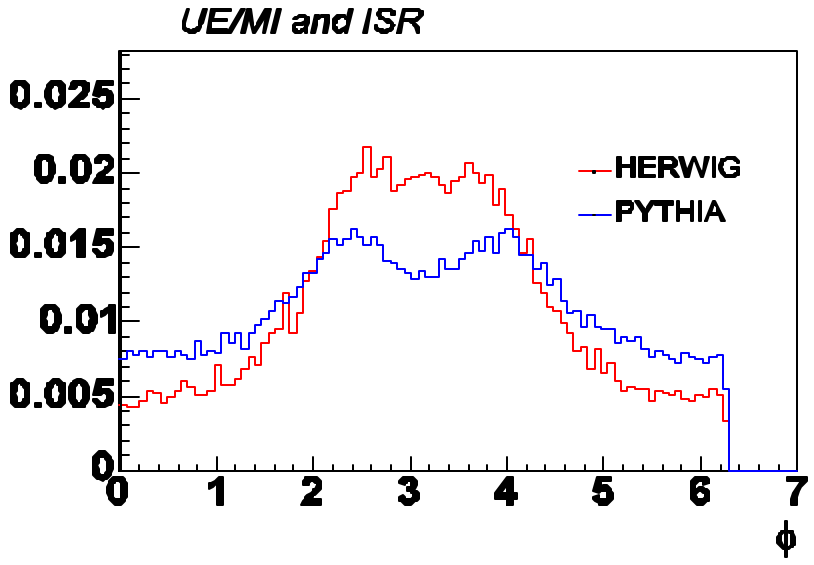


γ-2nd jet ϕ for all events









Future Work

- Comparison with data
- Generator tuning
- Cone vs Kt