Dijets and the Unintegrated Gluon Density

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Outline

→ Control Plots 2000 Data

→ Jet Resolutions

→ Azimuthal jet correlations

→ Gluon reconstruction

→ Summary

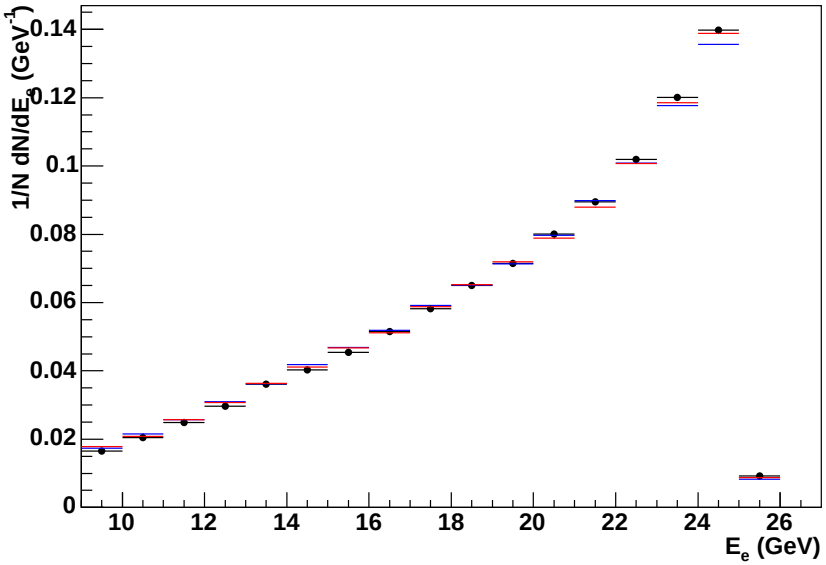
Control Plots 2000 Data

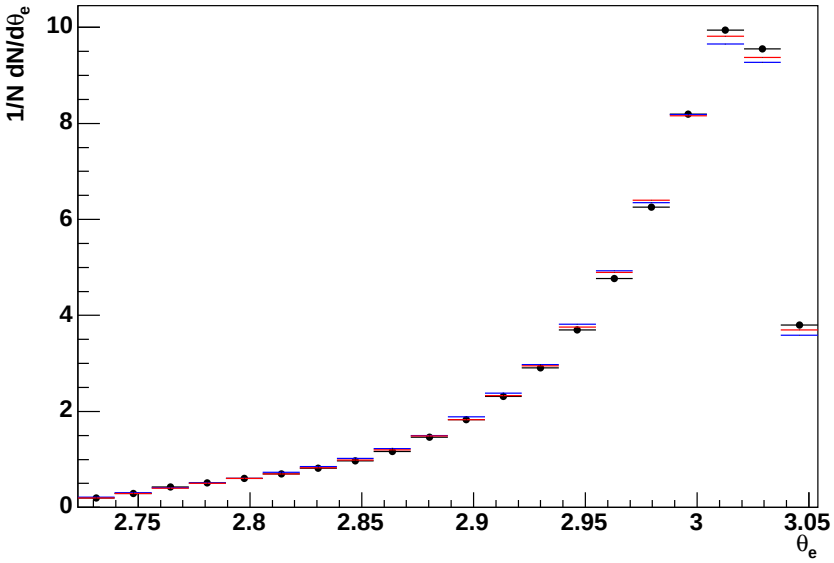
Selection

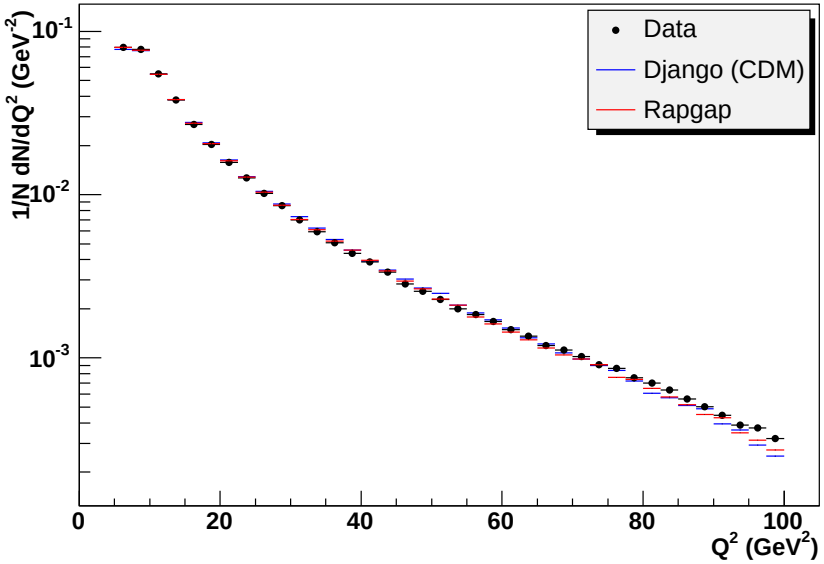
- 2000 Data vs Djangoh14 (CDM) and Rapgap v3.1

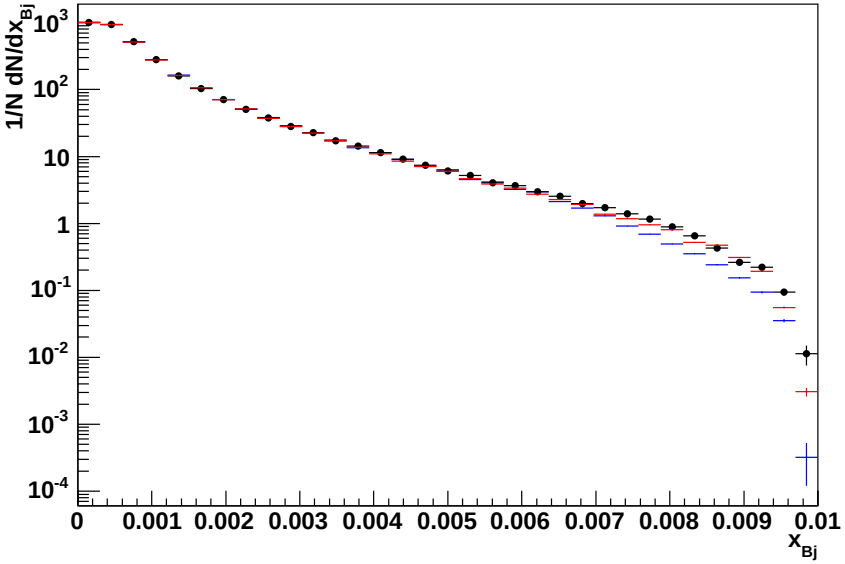
DIS Cuts			Dijet Cuts		
$5\ \text{GeV}^2 <$	Q^2	$< 100\ \text{GeV}^2$	$-1 <$	η_j	< 2.5
$0.1 <$	y	< 0.7	$5\ \text{GeV} <$	$E^*_{\perp j1,2}$	
$10^{-4} <$	x_{Bj}	$< 10^{-2}$		Sort in η	
$9\ \text{GeV} <$	E_e				
$156^\circ <$	θ_e	$< 175^\circ$			
$35\ \text{GeV} <$	$E - p_z$	$< 70\ \text{GeV}$			
	$\lvert z_{vtx} \rvert$	$< 35\ \text{cm}$			
	R_{clus}	$< 3.5\ \text{cm}$			
	E_{had}	$< 0.5\ \text{GeV}$			
	E_{veto}	$< 1.0\ \text{GeV}$			

Control Plots: DIS Sample

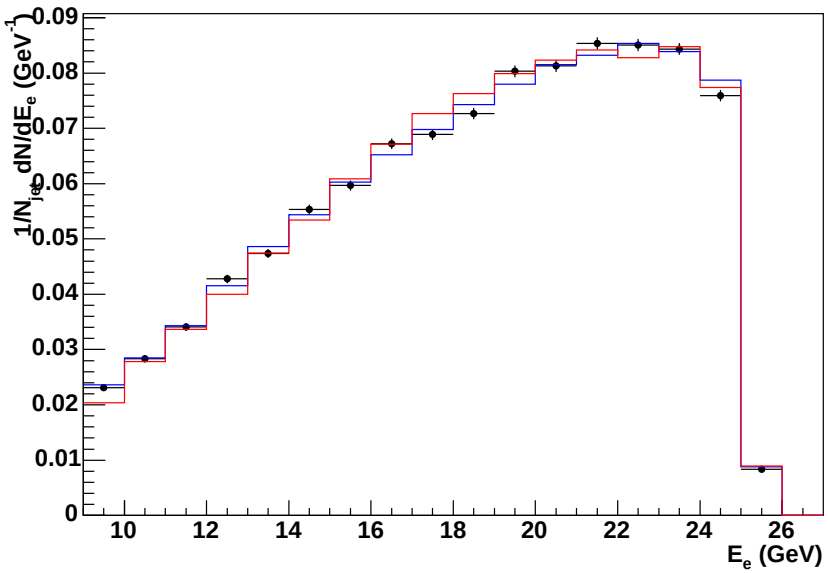


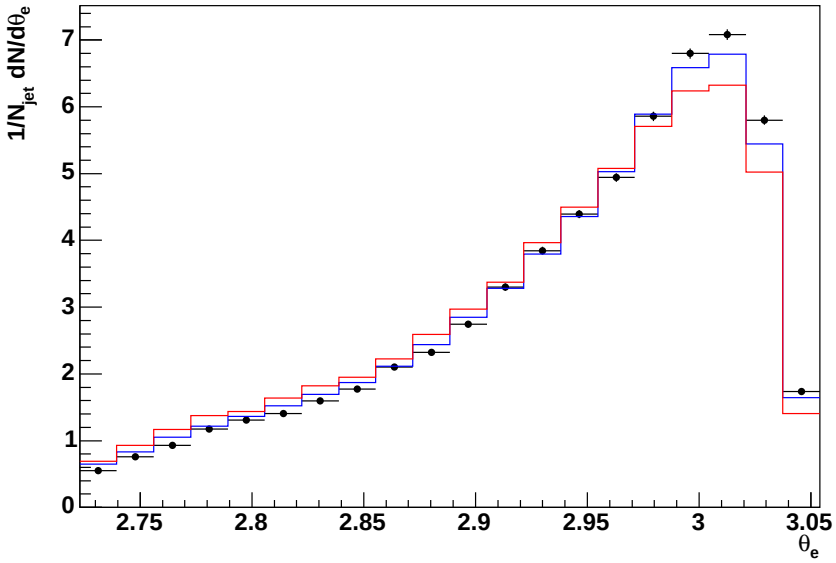


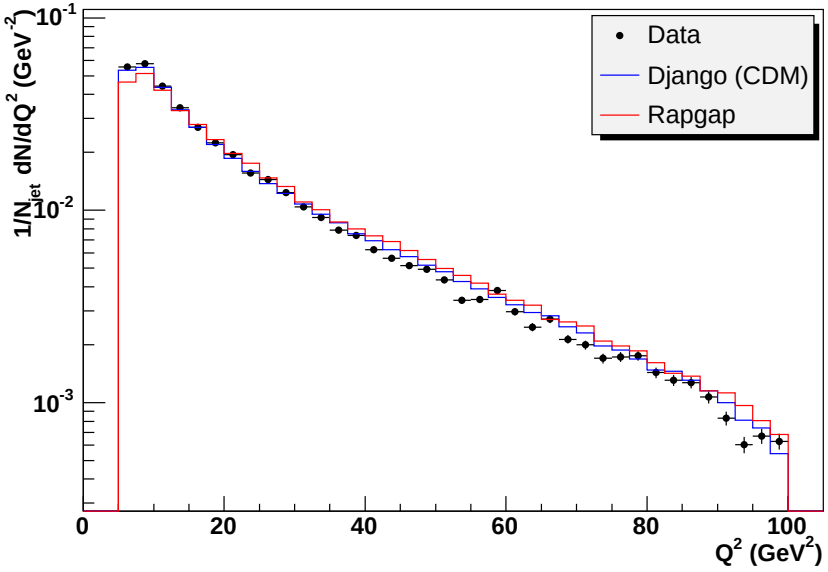


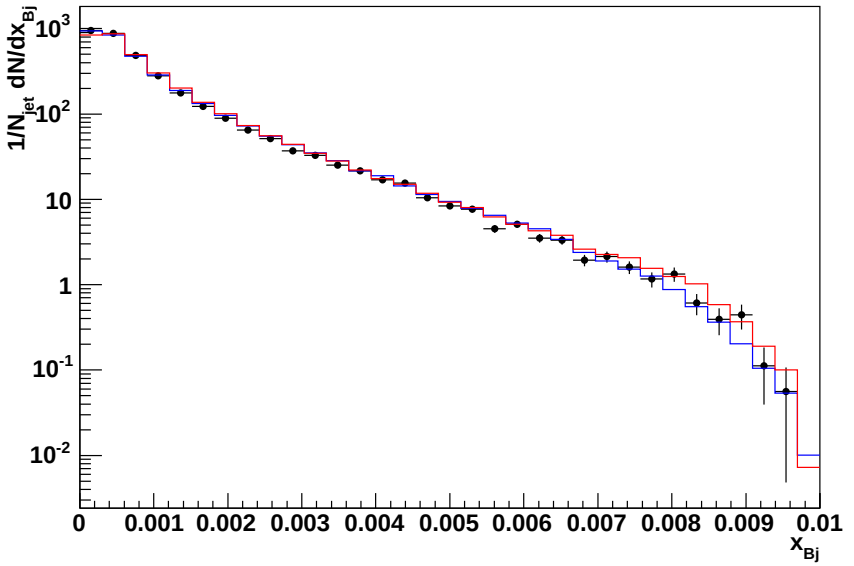


Control Plots: Dijet Sample

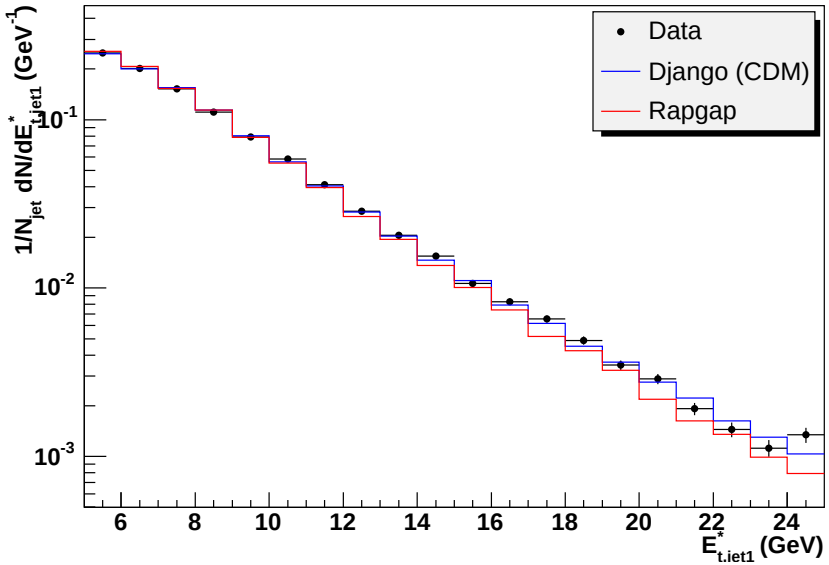


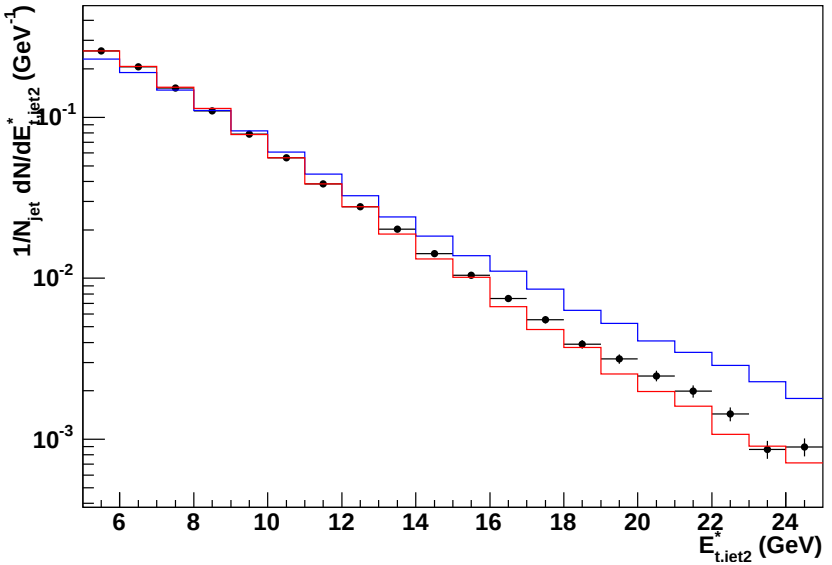


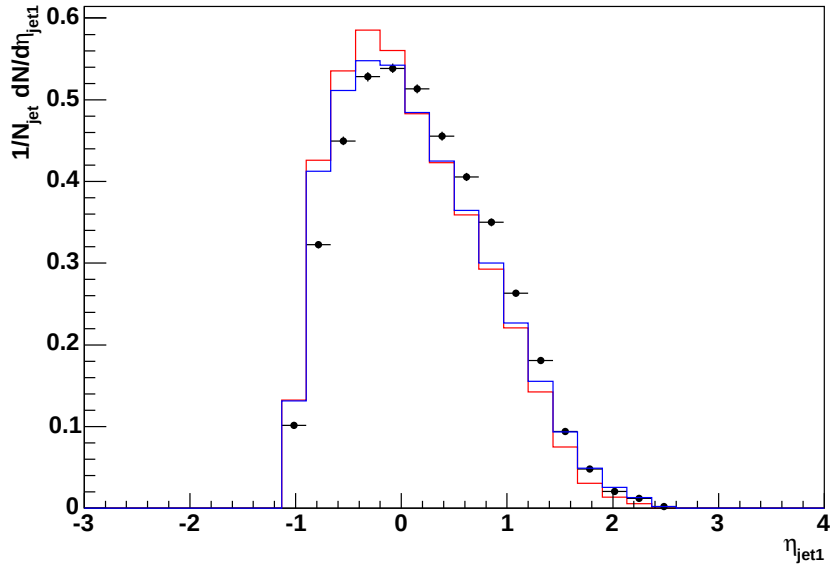


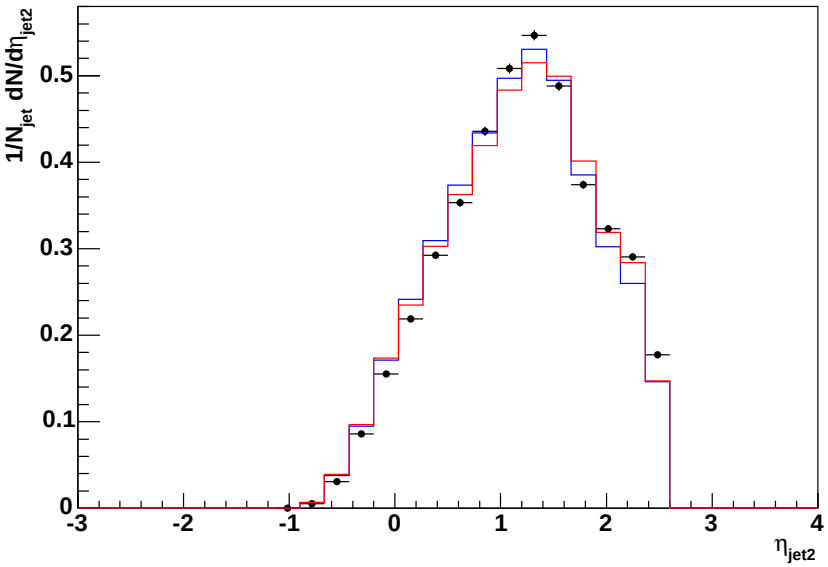


Control Plots: Dijet Sample

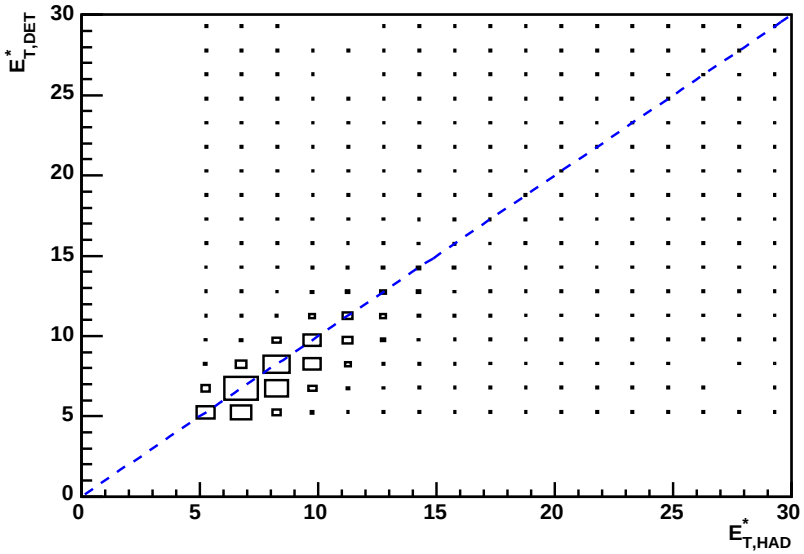


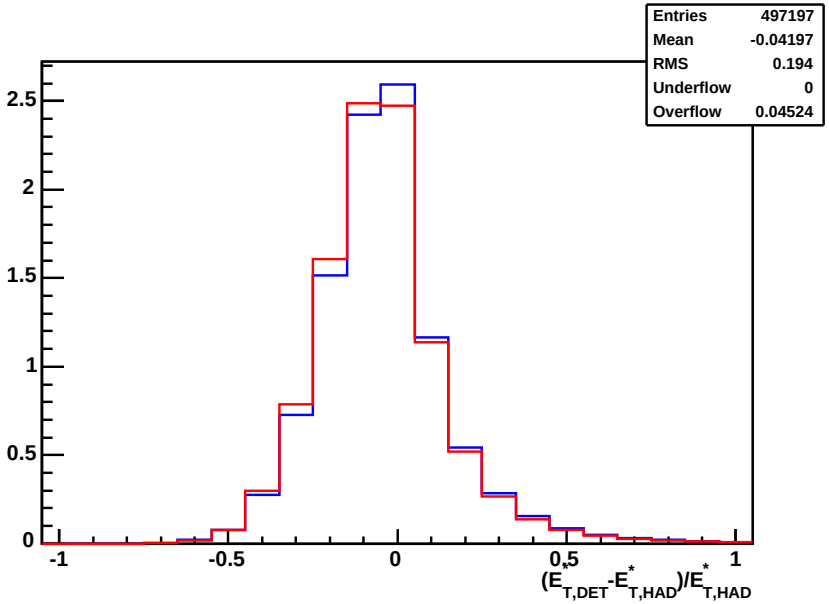


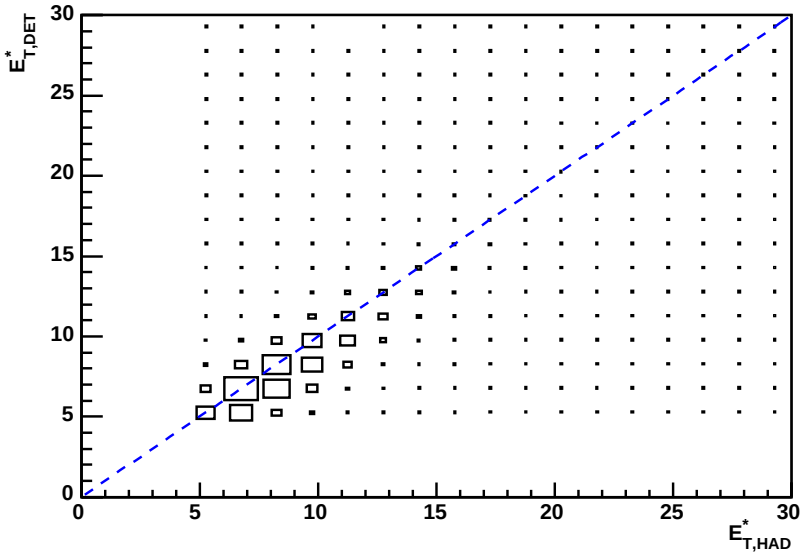


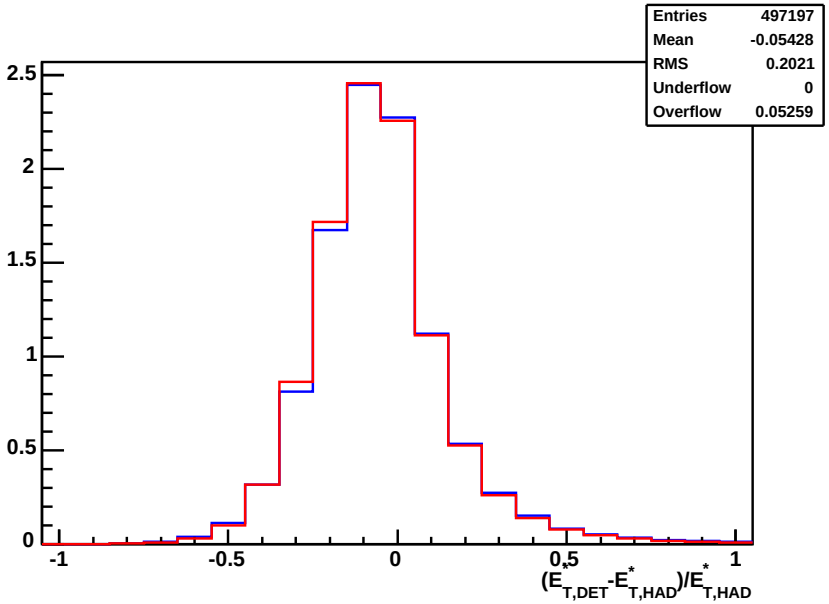


Jet Resolutions

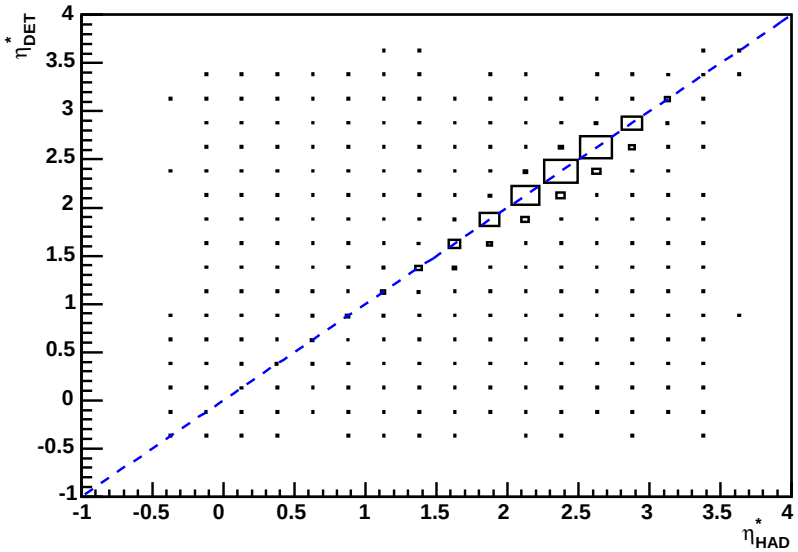


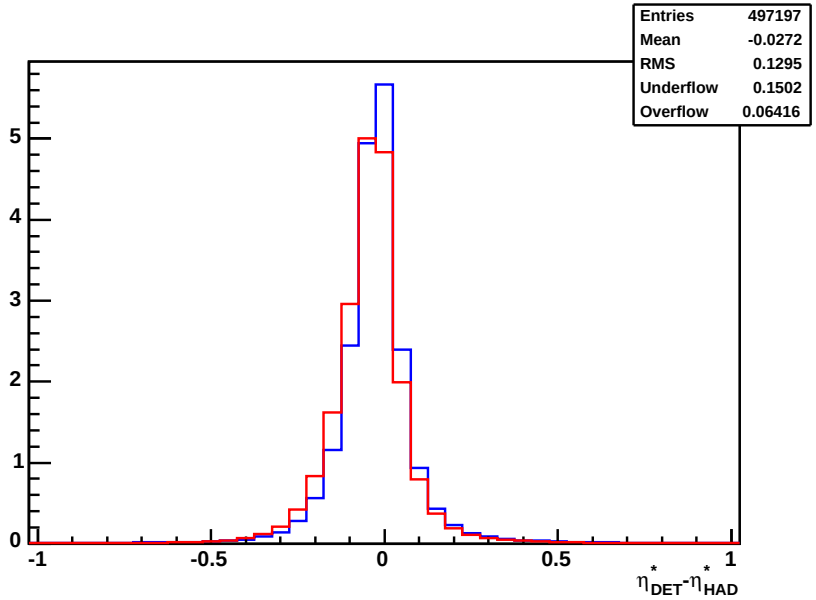


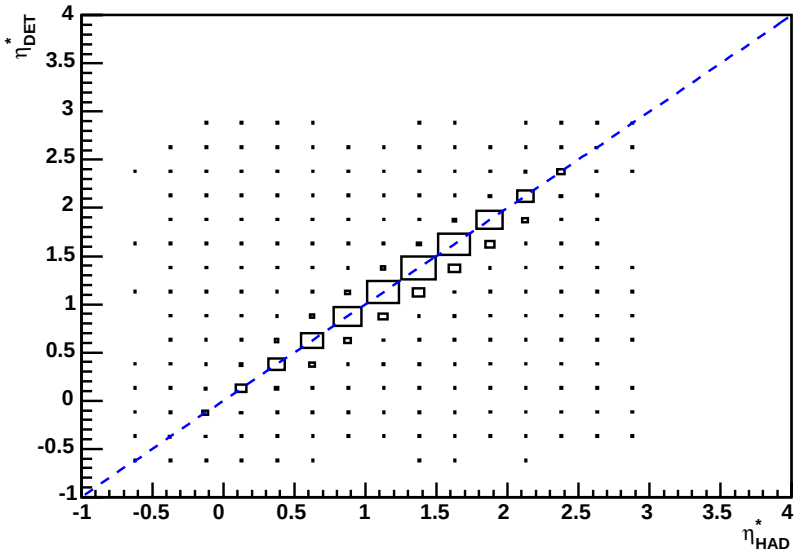


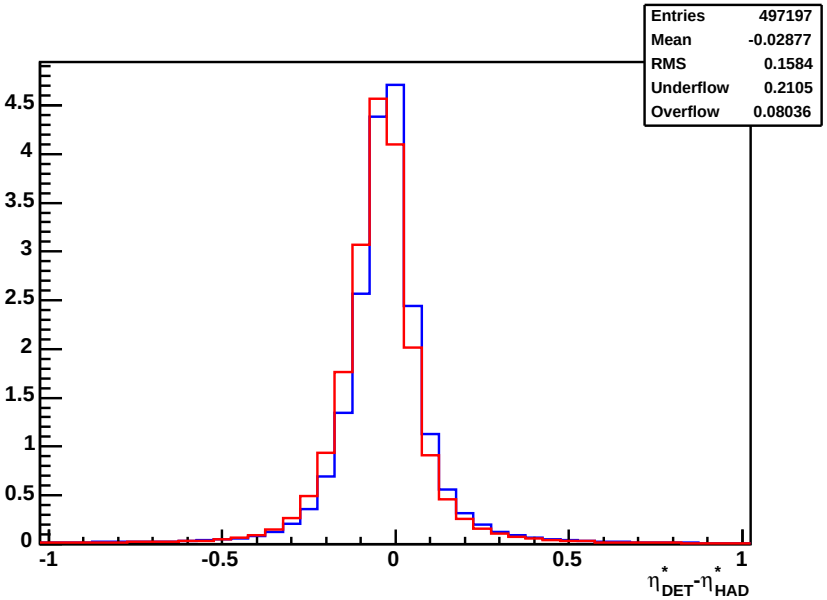


Jet Resolutions









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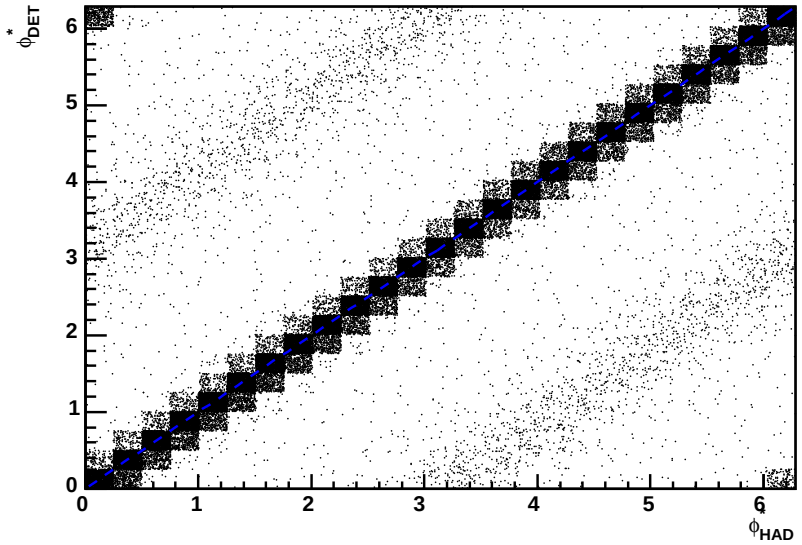
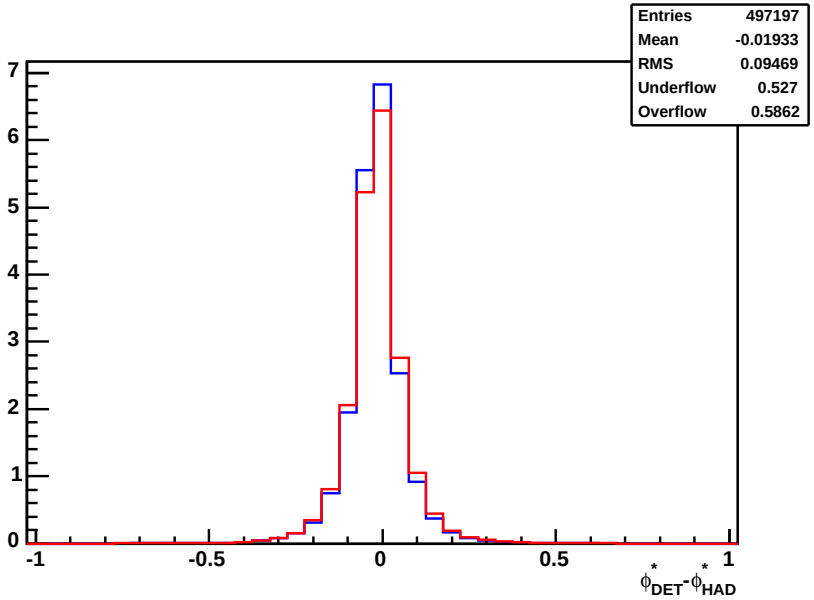
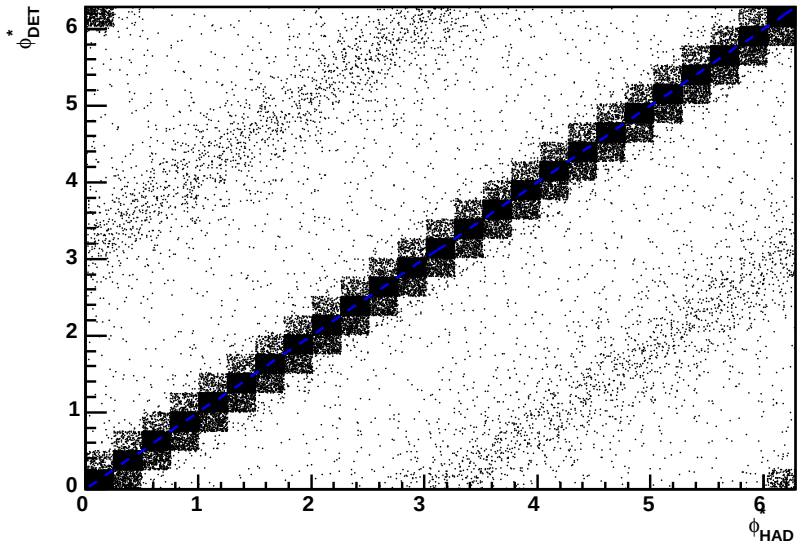
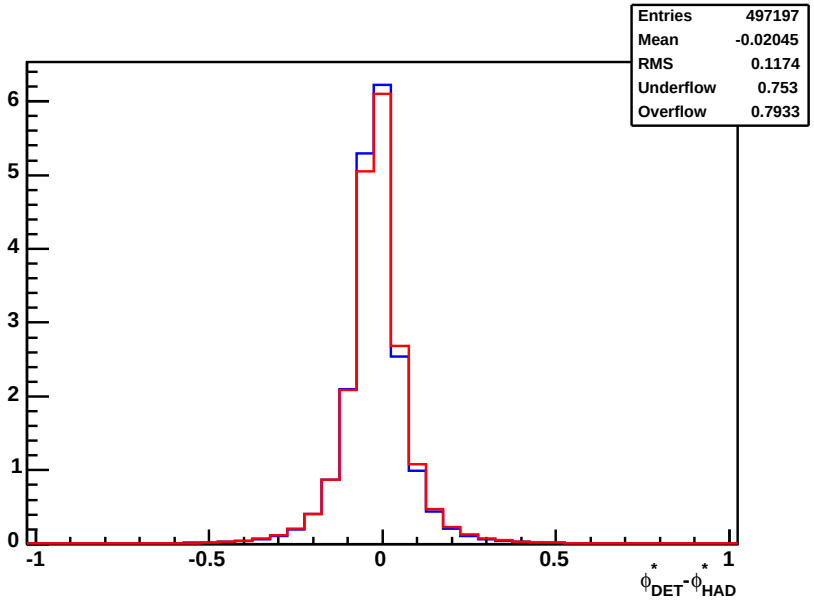




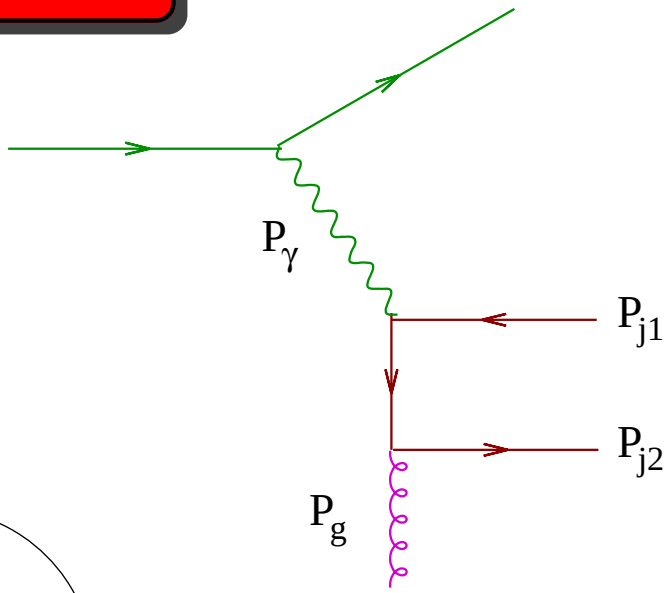




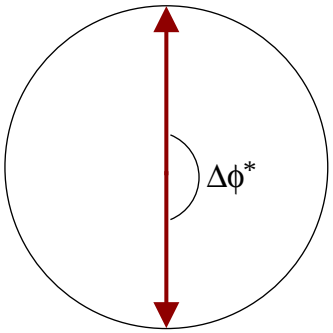
Azimuthal jet correlations

$$P_g = P_{j1} + P_{j2} - P_\gamma$$

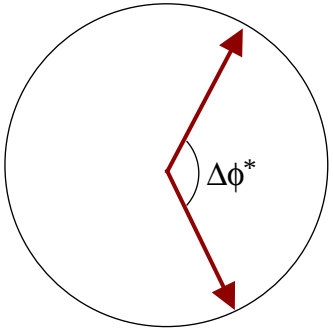
$$\Rightarrow k_t^{*2} = (p_{t1}^* + p_{t2}^*)^2$$
$$= p_{t1}^{*2} + p_{t2}^{*2} + 2|p_{t1}^*||p_{t2}^*|cos\Delta\phi^*$$

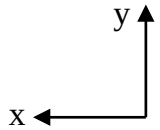


$$k_t^* = 0 \Rightarrow \Delta\phi^* = 180°$$

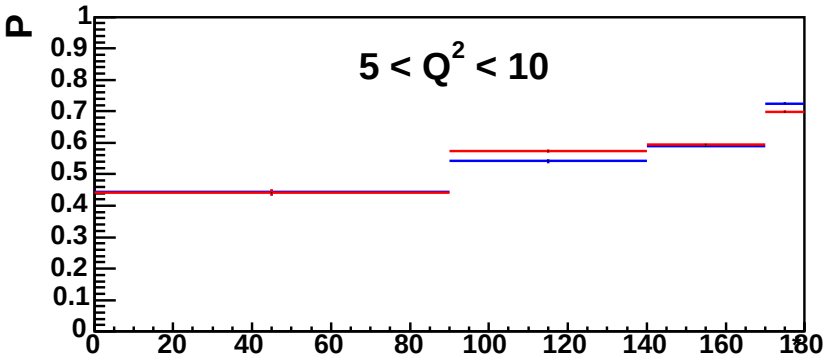


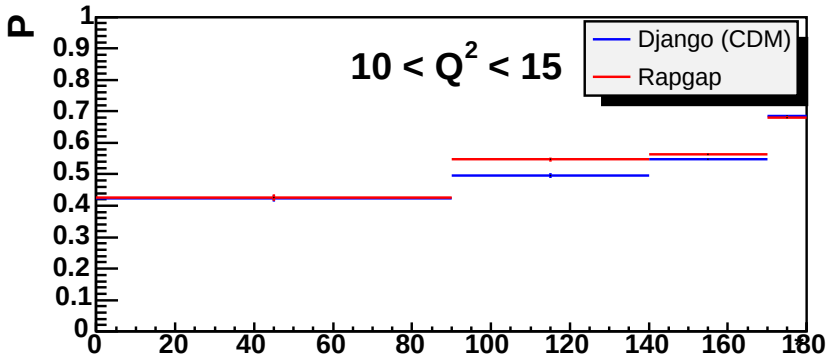
$$k_t^* \neq 0 \Rightarrow \Delta\phi^* < 180°$$

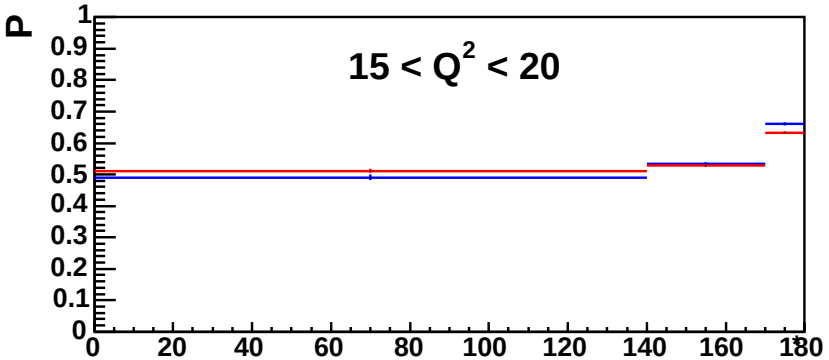


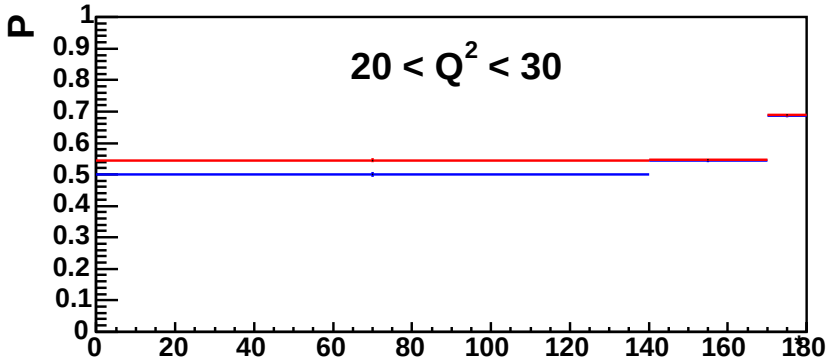


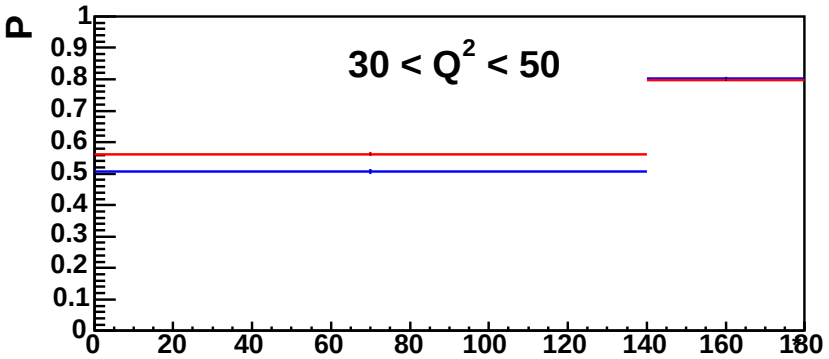
Azimuthal jet correlations

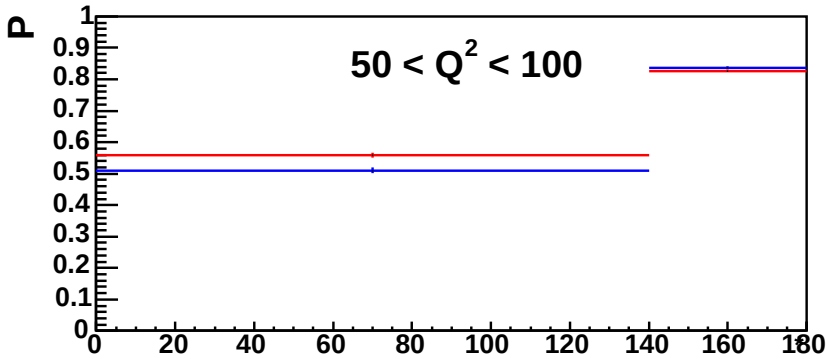












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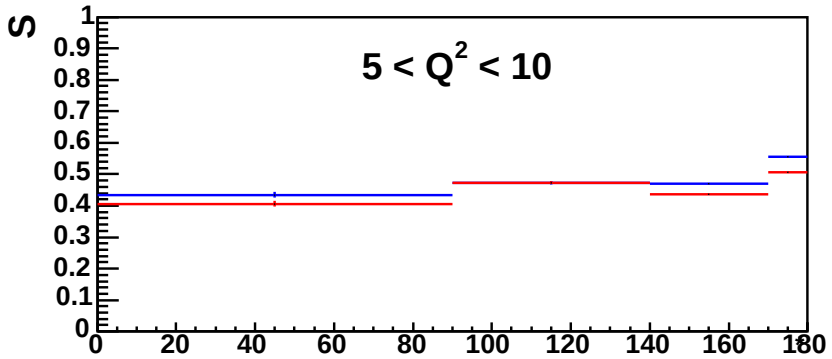
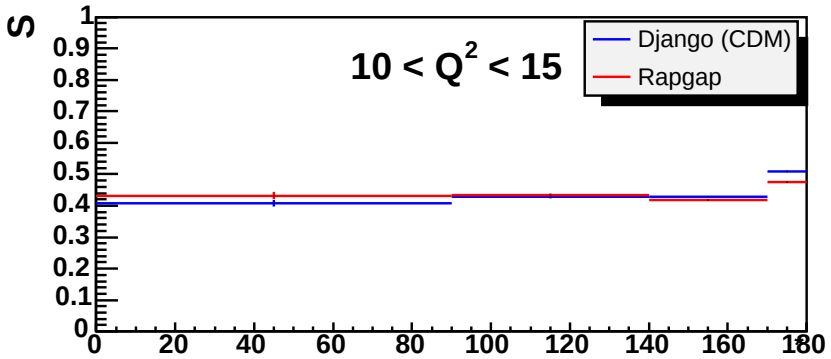
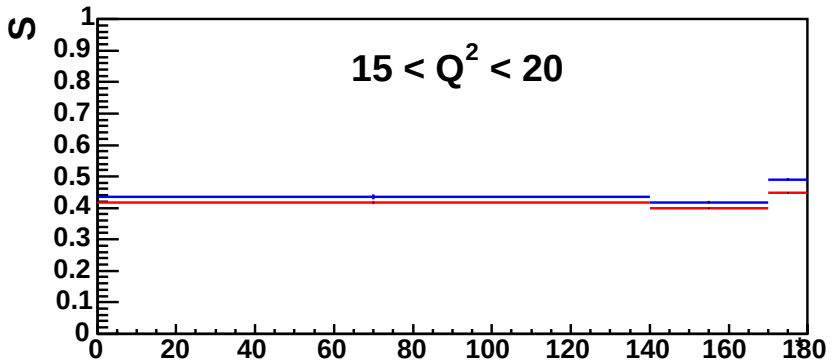
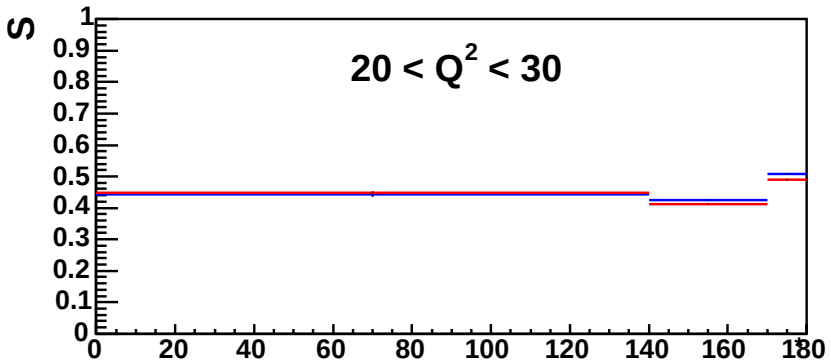
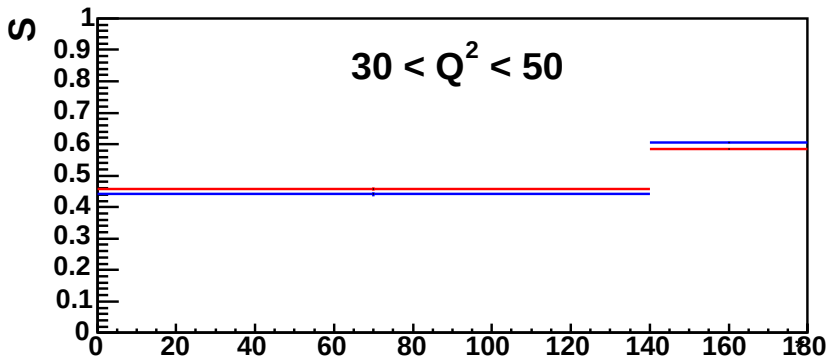
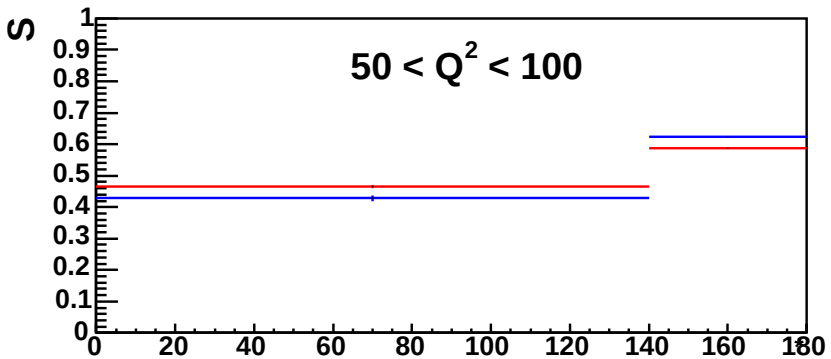




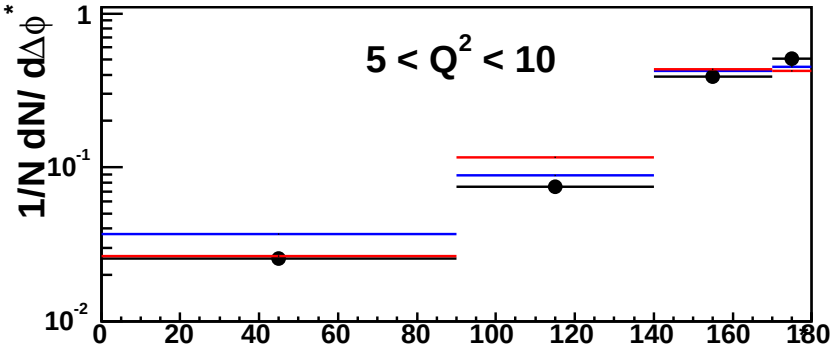


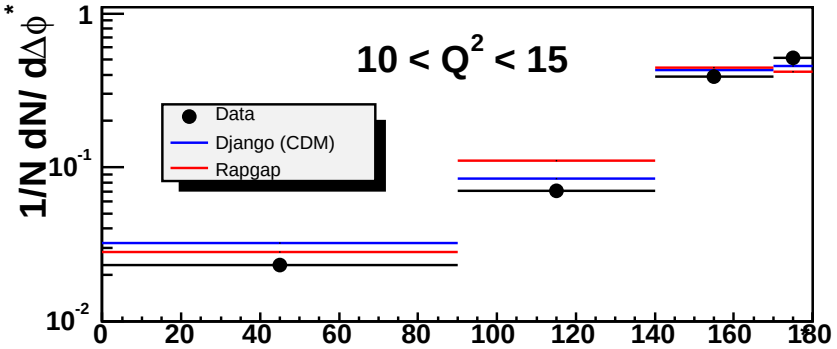


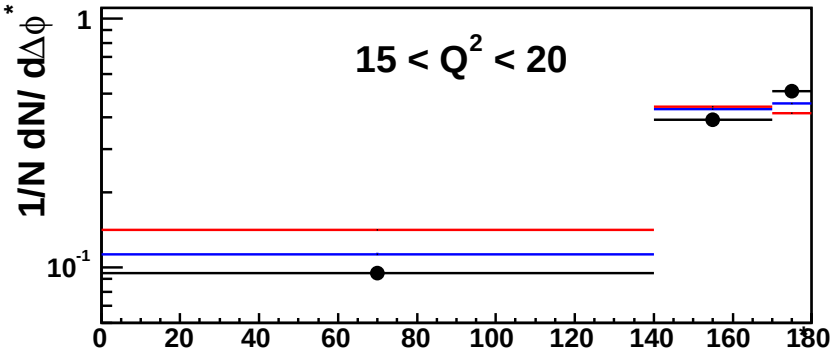


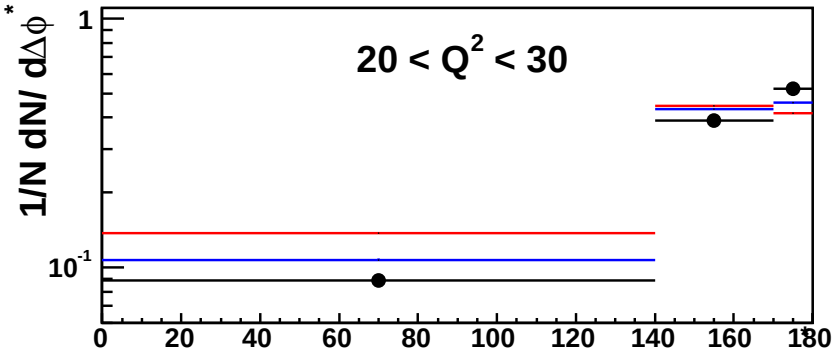


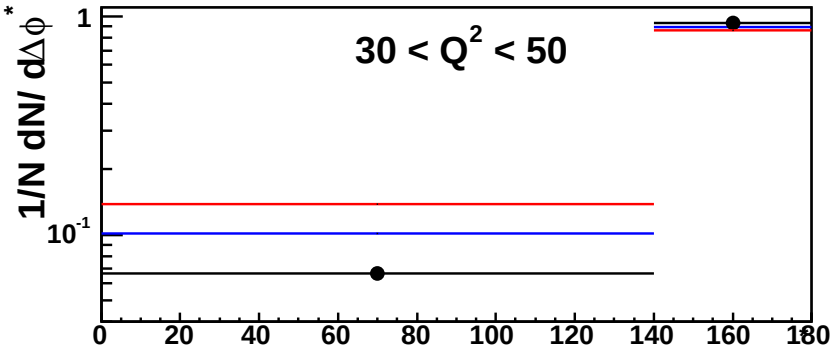
Azimuthal jet correlations

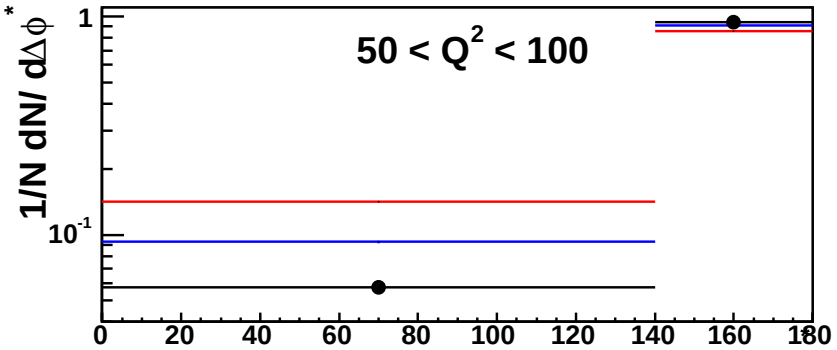








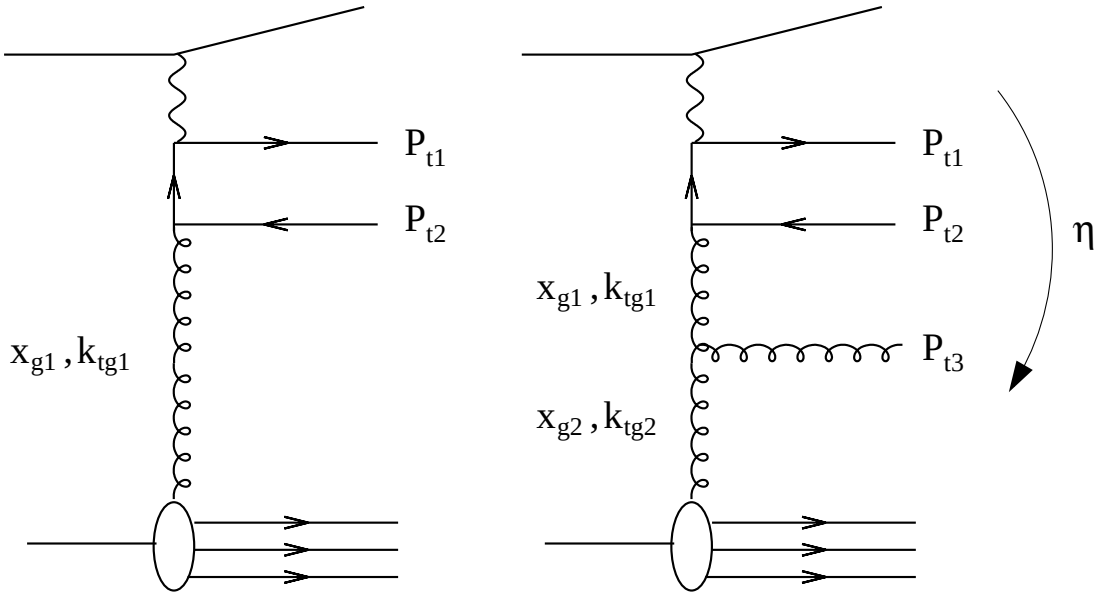




Gluon Reconstruction

- Reconstruct x_g, k_{tg}^2 and $\bar{q}$, using DIS dijet events

$\Rightarrow$ Direct mapping of unintegrated gluon density $\mathcal{F}(x_g, k_{tg}^2, \bar{q}^2)$



$$P_g = P_{j1} + P_{j2} - P_\gamma$$

$$\Rightarrow x_g = \frac{E_g + |p_{zg}|}{E_p + |p_{zp}|}$$

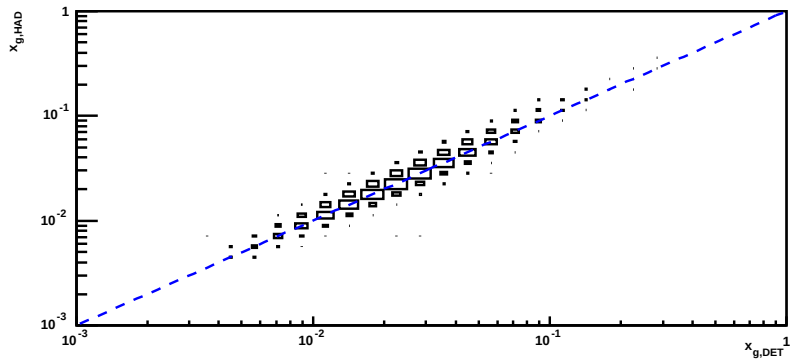
$$k_{tg}^2 = p_{xg}^2 + p_{yg}^2$$

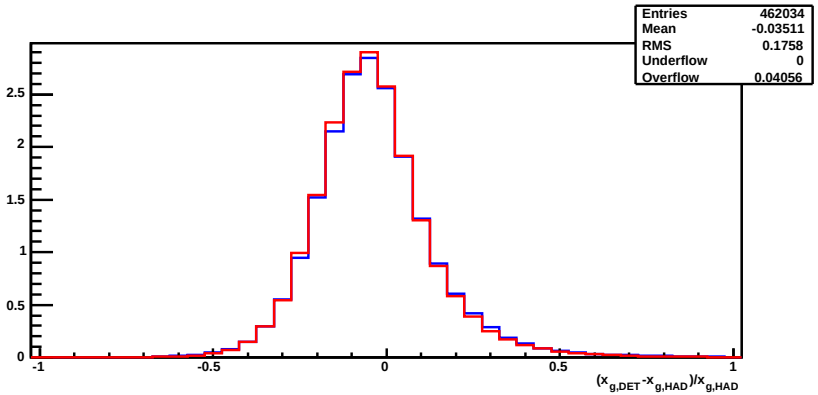
$$\bar{q} = x_g \cdot \sqrt{\frac{E_p}{E_e} s e^{-2\eta_{jj}}}$$

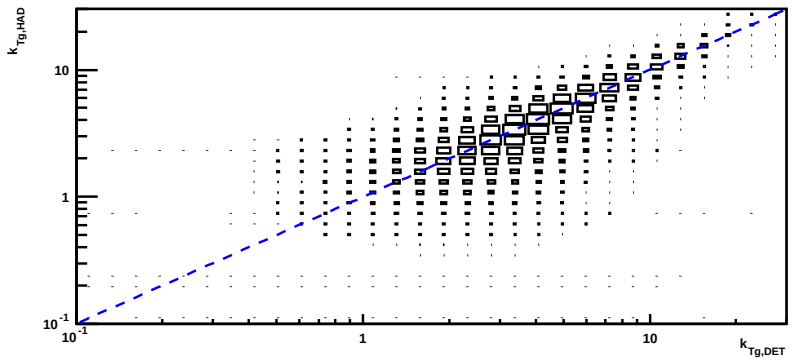
$$\eta_{jj} = \frac{1}{2} log\left(\frac{E_{jj} + P_{zjj}}{E_{jj} - P_{zjj}}\right)$$

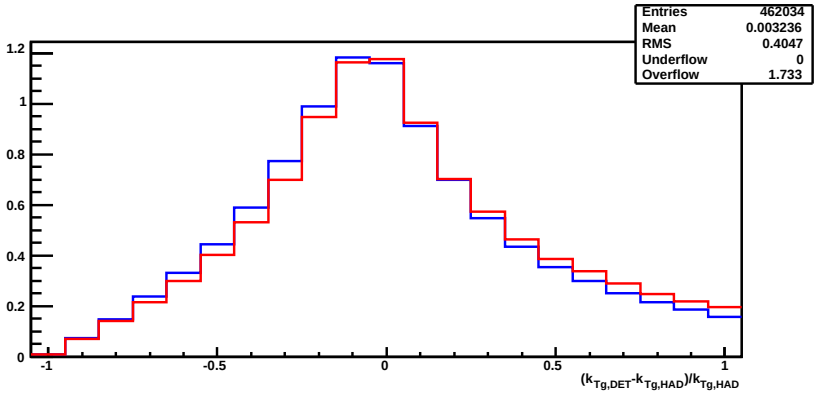
index jj is combined dijet system

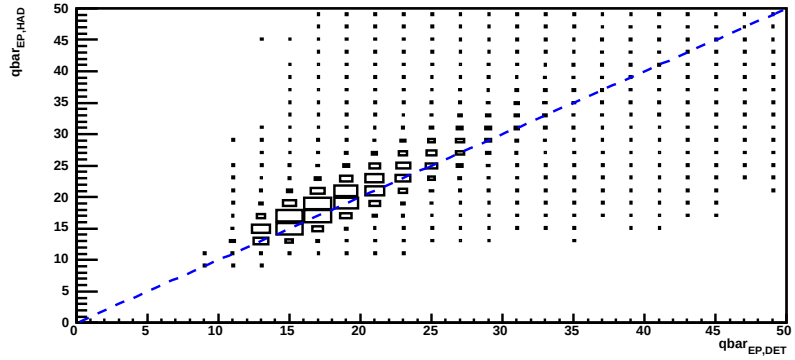
Gluon Reconstruction

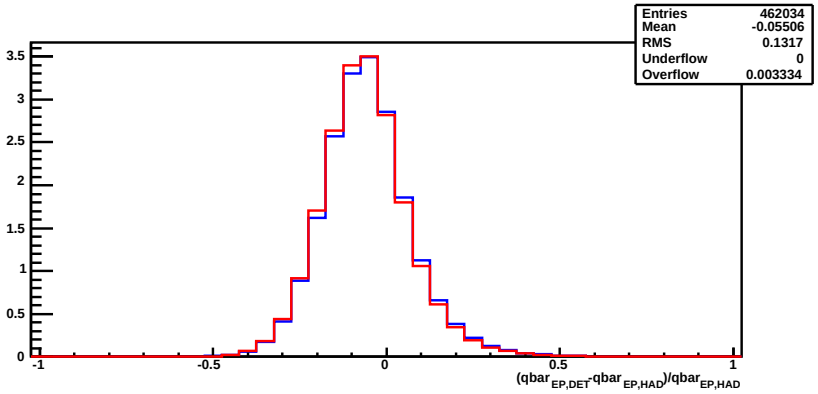




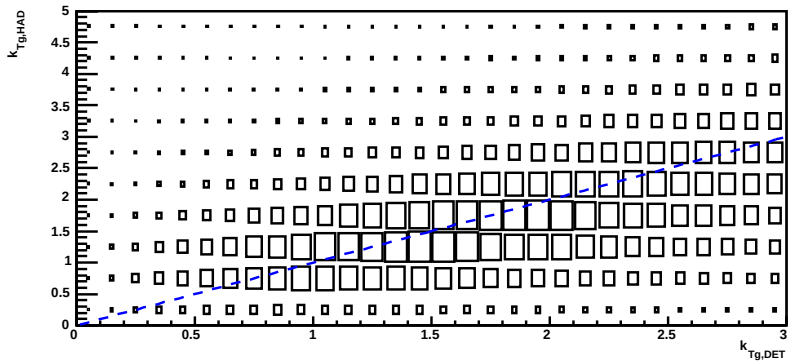


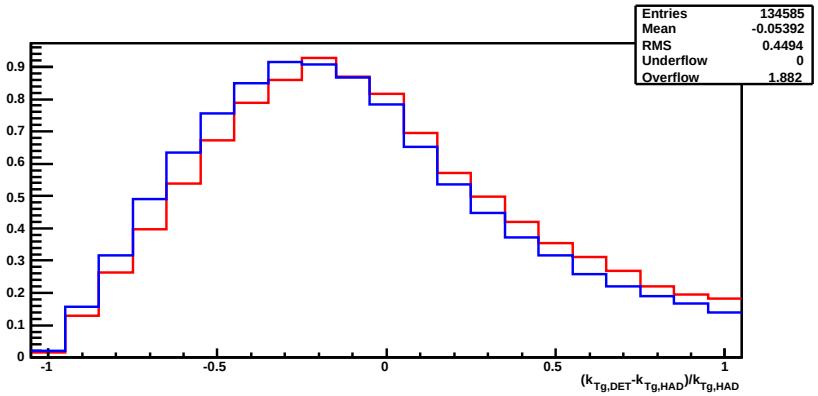


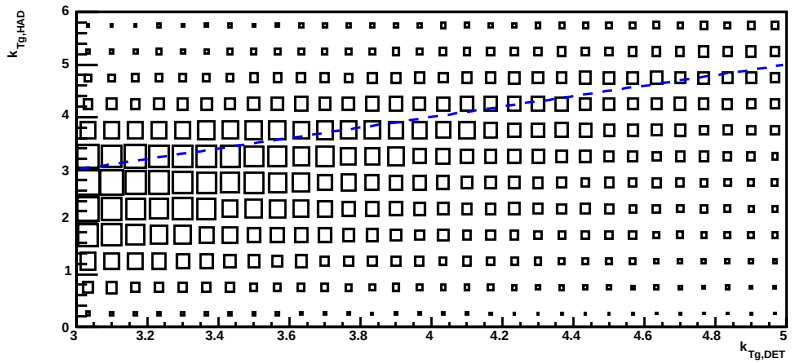


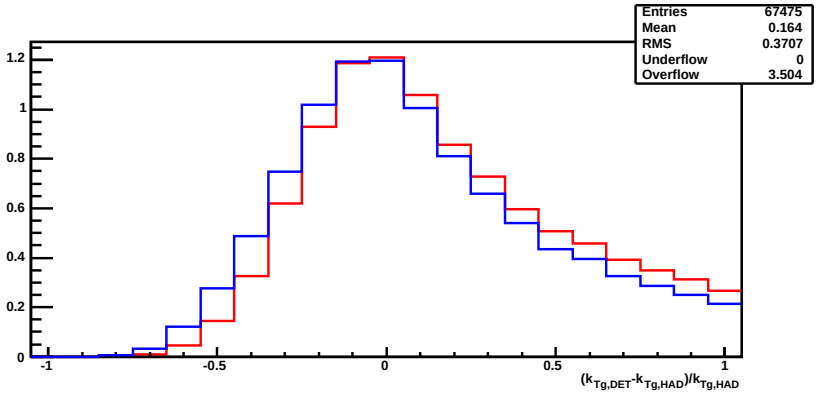


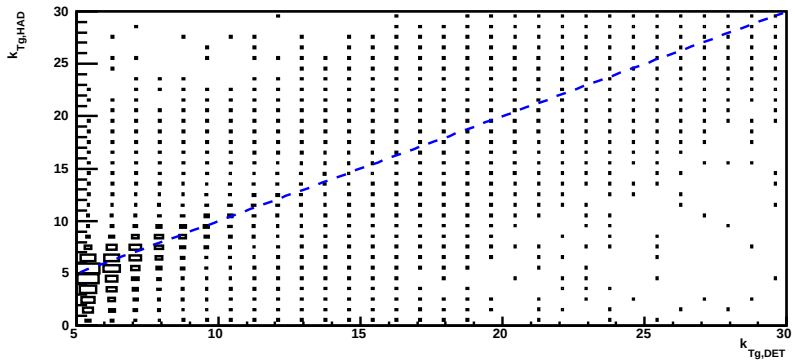
Gluon Reconstruction

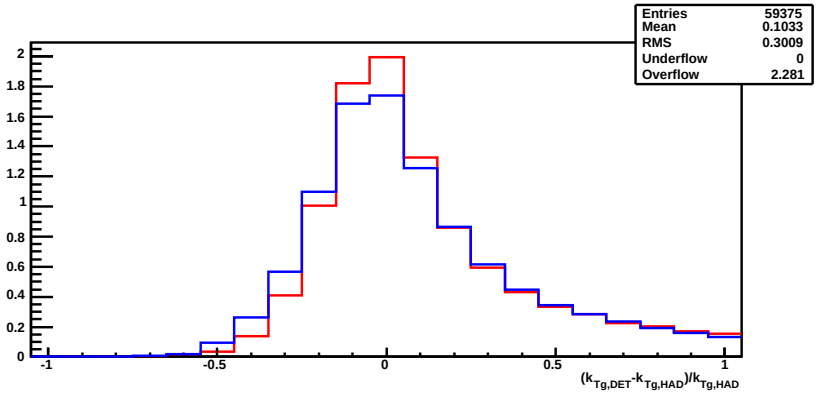












Summary

- Control Plots OK (almost...)
- Jet resolutions OK
- $\Delta\phi^*$ plots looks strange...
- Reconstruction of x_g and $\bar{q}$ OK, k_t not OK