

*t $\bar{t}$ ( $\gamma$ ) Control Region*

double binning

 $p_{\text{T}}^{\text{leading}}$   
 $p_{\text{T}}^{\text{trailing}}$   
 $p_{\text{T}}^{N_{\text{Jets}}}$   
 $H_{\text{T}}$ 
 $\phi^{\text{leading}}$   
 $\phi^{\text{trailing}}$   
 $p_{\text{T}}^{\text{miss}}$   
 $p_{\text{T}}^{\gamma}$   
 $p_{\text{T}}$ 
 $\eta^{\text{trailing}}$   
 $\eta^{\text{leading}}$   
 $m_{\text{ll}}$ 

normal binning

 $p_{\text{T}}^{\text{leading}}$   
 $p_{\text{T}}^{\text{trailing}}$   
 $p_{\text{T}}^{N_{\text{Jets}}}$   
 $H_{\text{T}}$ 
 $\phi^{\text{leading}}$   
 $\phi^{\text{trailing}}$   
 $p_{\text{T}}^{\text{miss}}$   
 $p_{\text{T}}^{\gamma}$   
 $p_{\text{T}}$ 
 $\eta^{\text{trailing}}$   
 $\eta^{\text{leading}}$   
 $m_{\text{ll}}$ 

half binning

 $p_{\text{T}}^{\text{leading}}$   
 $p_{\text{T}}^{\text{trailing}}$   
 $p_{\text{T}}^{N_{\text{Jets}}}$   
 $H_{\text{T}}$ 
 $\phi^{\text{leading}}$   
 $\phi^{\text{trailing}}$   
 $p_{\text{T}}^{\text{miss}}$   
 $p_{\text{T}}^{\gamma}$   
 $p_{\text{T}}$ 
 $\eta^{\text{trailing}}$   
 $\eta^{\text{leading}}$   
 $m_{\text{ll}}$ 

- $\alpha$  (int. method)
- stat. error (int. method)
- $\alpha$  ( $\chi^2$  method)
- mean ( $\chi^2$  method)

0.7

0.75

0.8

0.85

Scale Factor  $\alpha_{t\bar{t}(\gamma)}$