Jet smearing - status

UHH-CMS SUSY Meeting

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für Bildung
und Forschung

Input sample from ToyMC

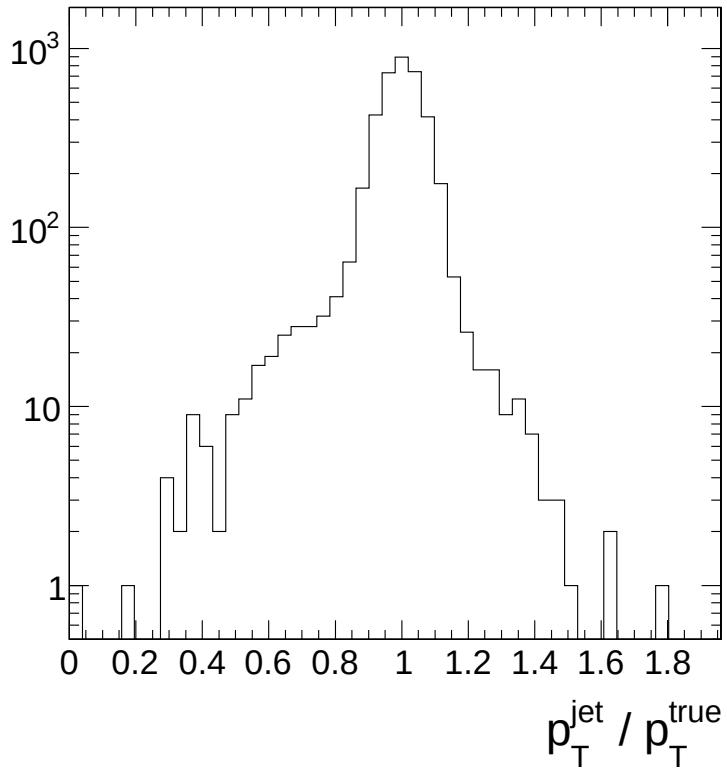
Disclaimer: **All shown results from `SmearCore` framework**

- Generation of dijet and γ-jet events
- Response probability density as sum of two Gaussians

$$p(R) = c \cdot G_0(R; 1, \sigma_0) + (1-c) \cdot G_1(R; \mu_1, \sigma_1)$$

where $c = 0.96$, $\sigma_0 = 0.06$, $\mu_1 = 0.9$, and $\sigma_1 = 0.25$

- p_T^{true}-spectrum flat or powerlaw



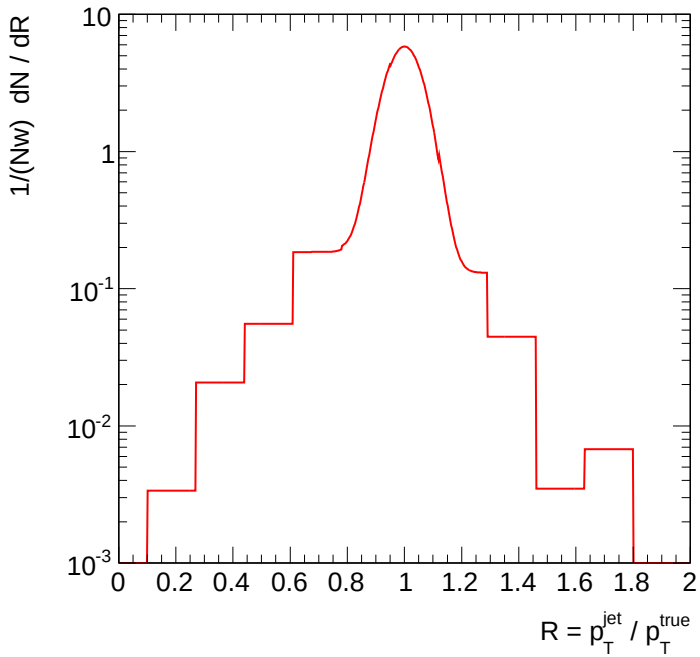
- Similar to response from Summer08 dijet sample with $600 < \hat{p}_T < 800$ GeV

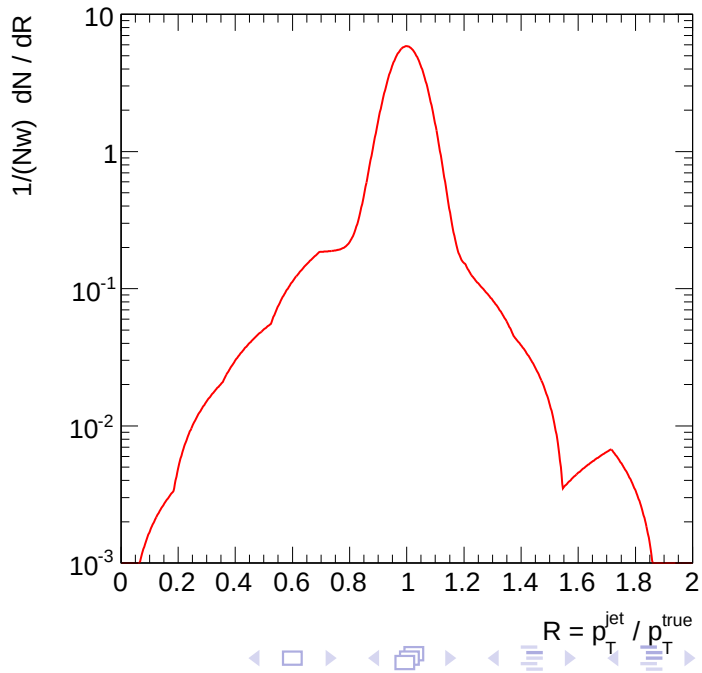
Fitted response: Gauss + step function

- Response probability density

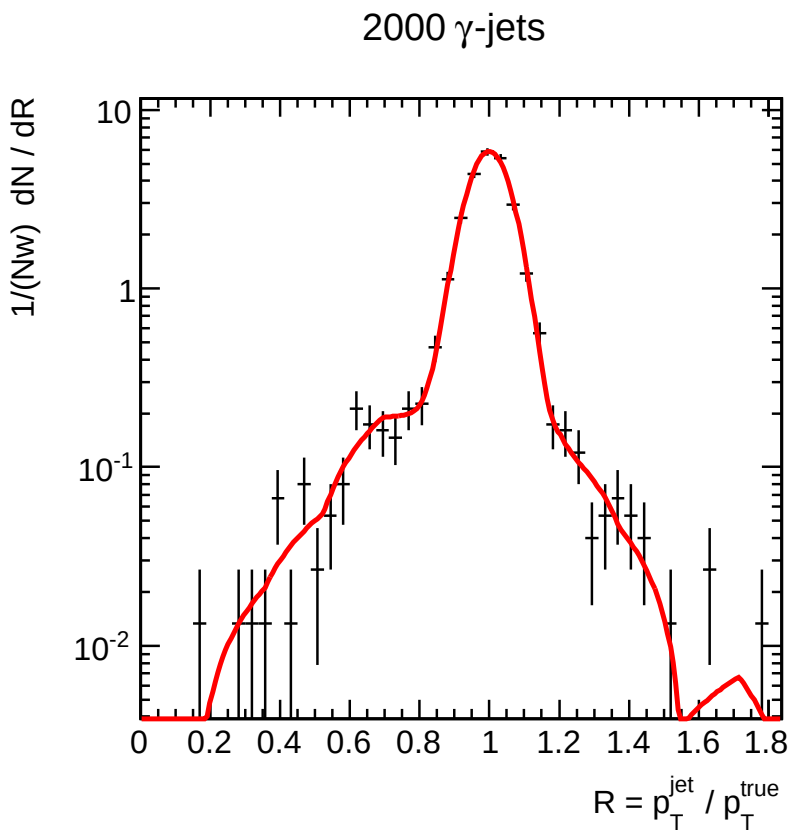
$$p(R) = c \cdot G(R; 1, \sigma) + (1 - c) \cdot f_{10}(R; \mathbf{b})$$

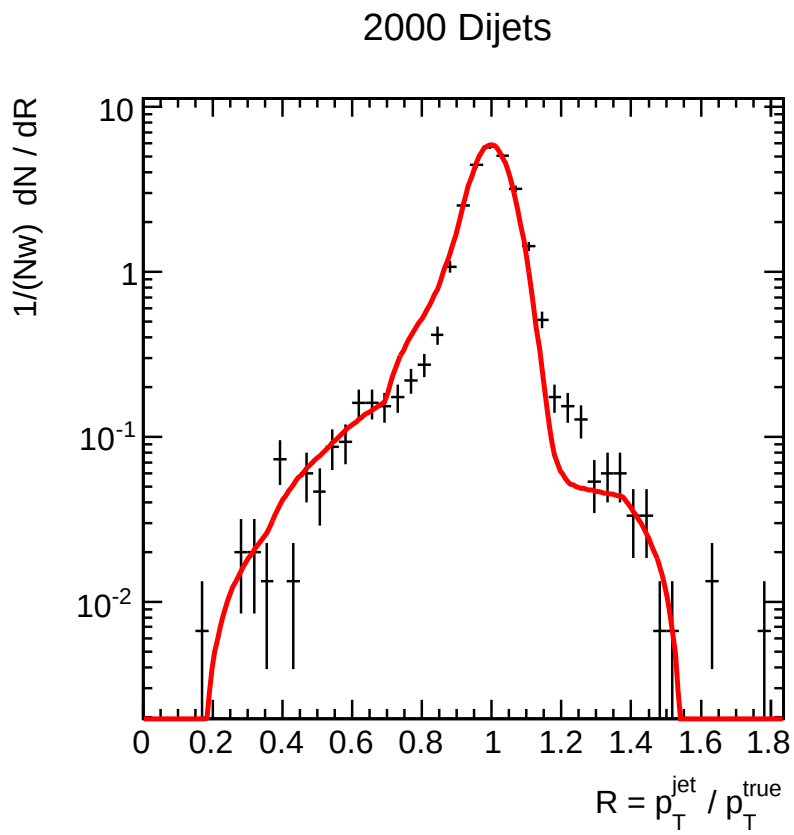
- f_{10} step function
  - 10 bins in $0.1 < R < 1.8$
  - Bin content $b_i \geq 0$ by construction
  - Quadratically divergent penalty term to guide minimization
  - Actual $f_{10}(R)$ is linear interpolation of bin contents



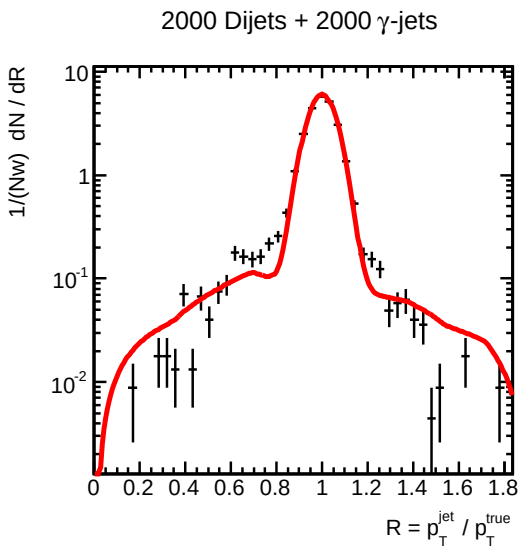


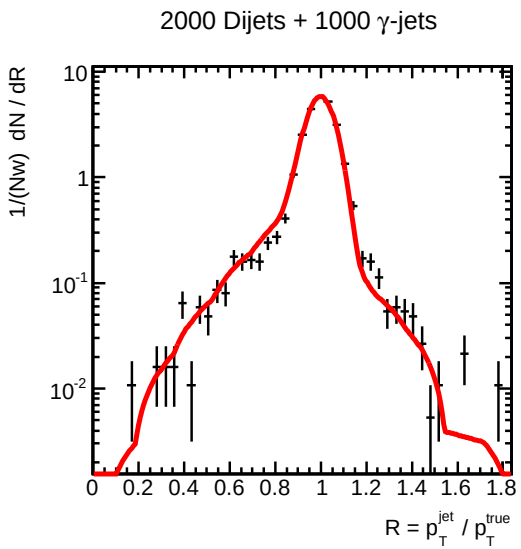
Fit results: separate fits for dijet and γ-jet events

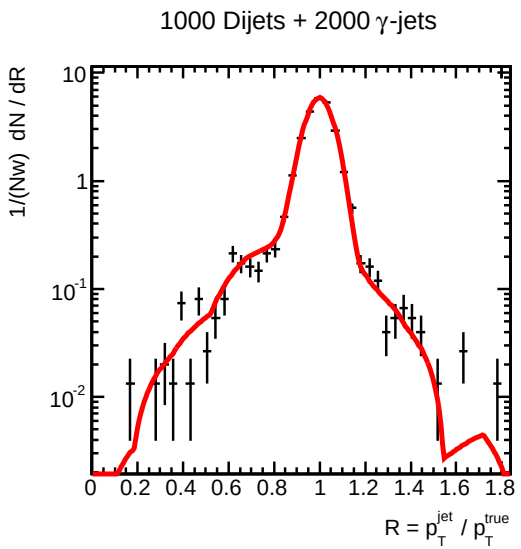




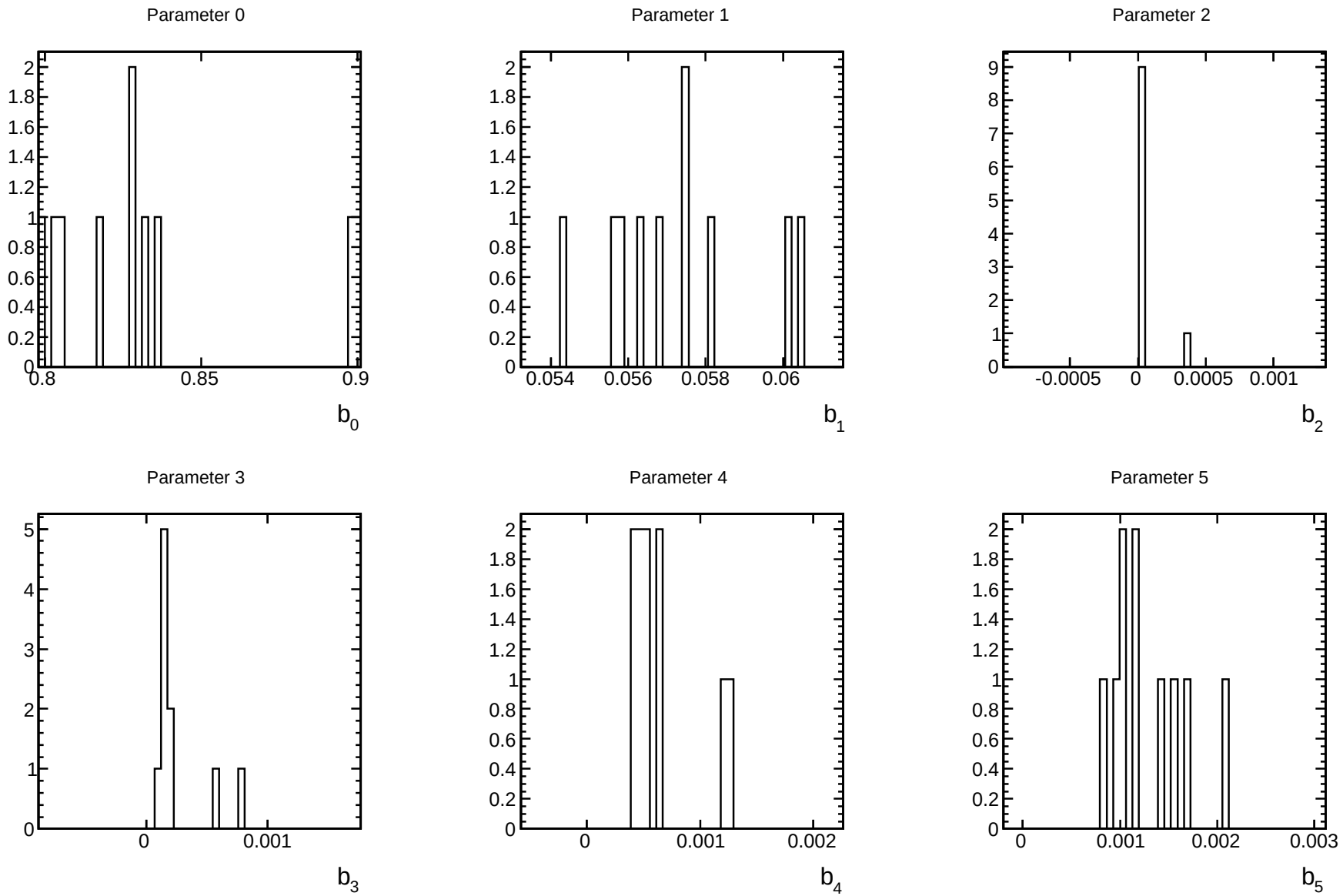
Fit results: combined fits for dijet and γ-jet events







Fit stability (successive fit of 10 different samples)



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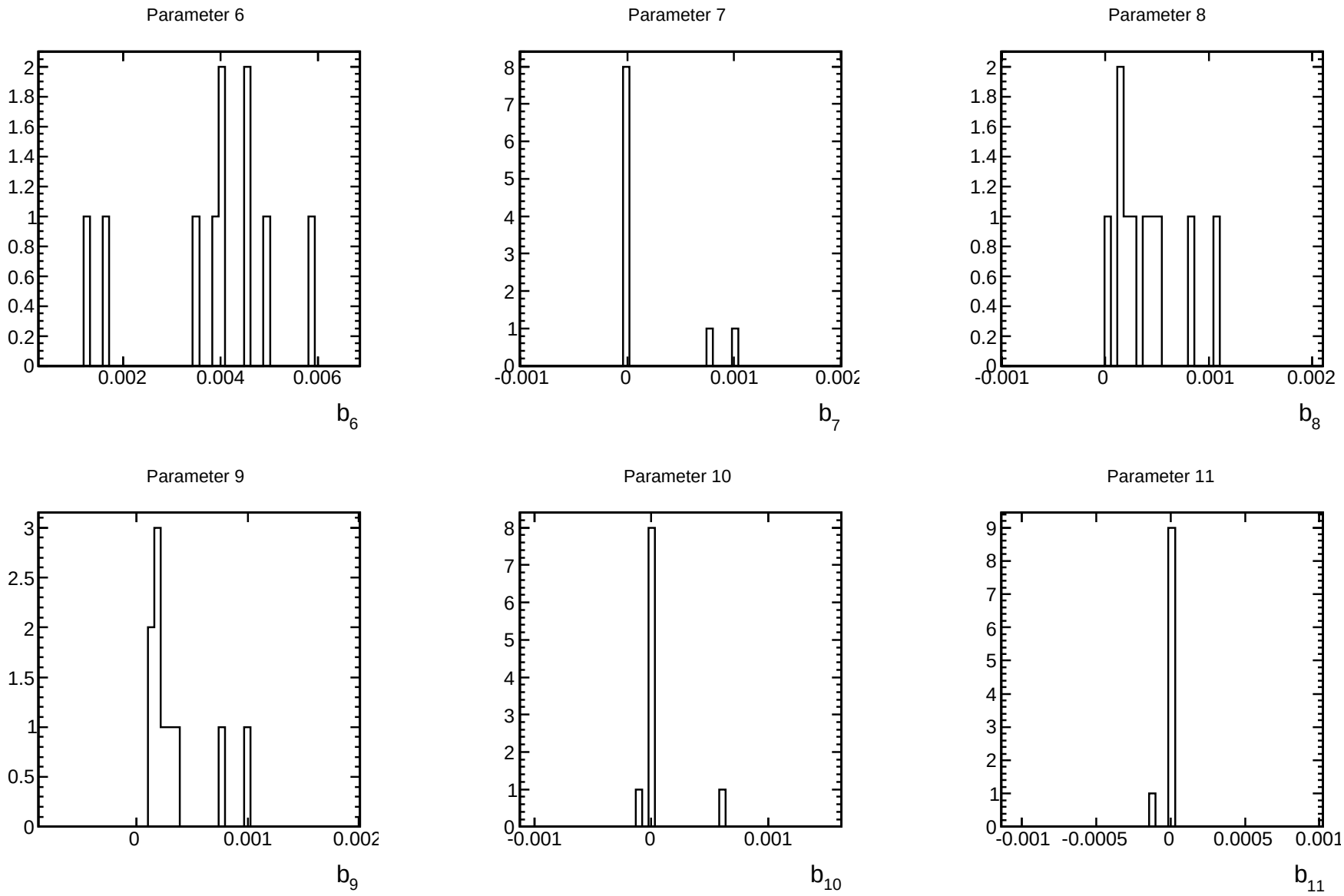
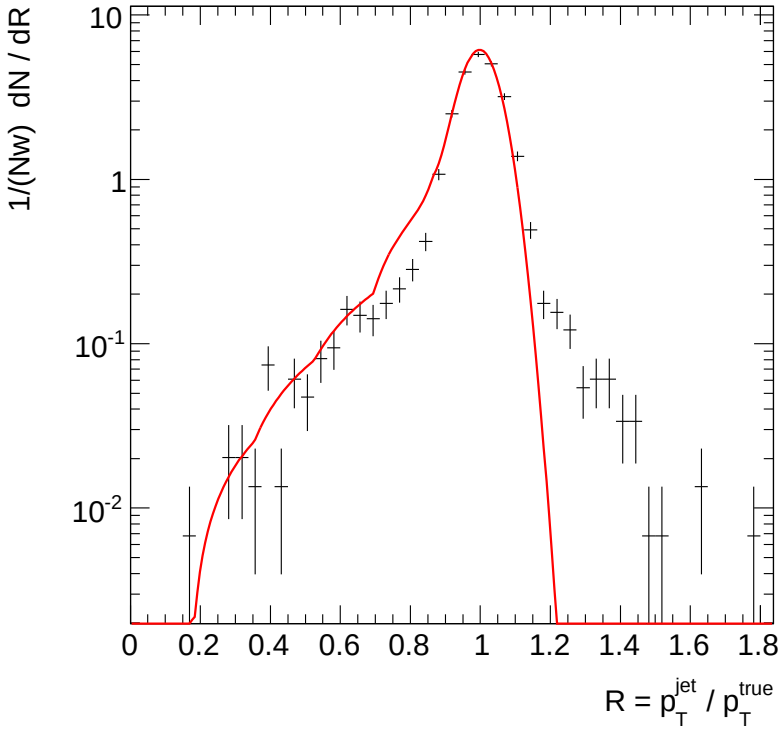
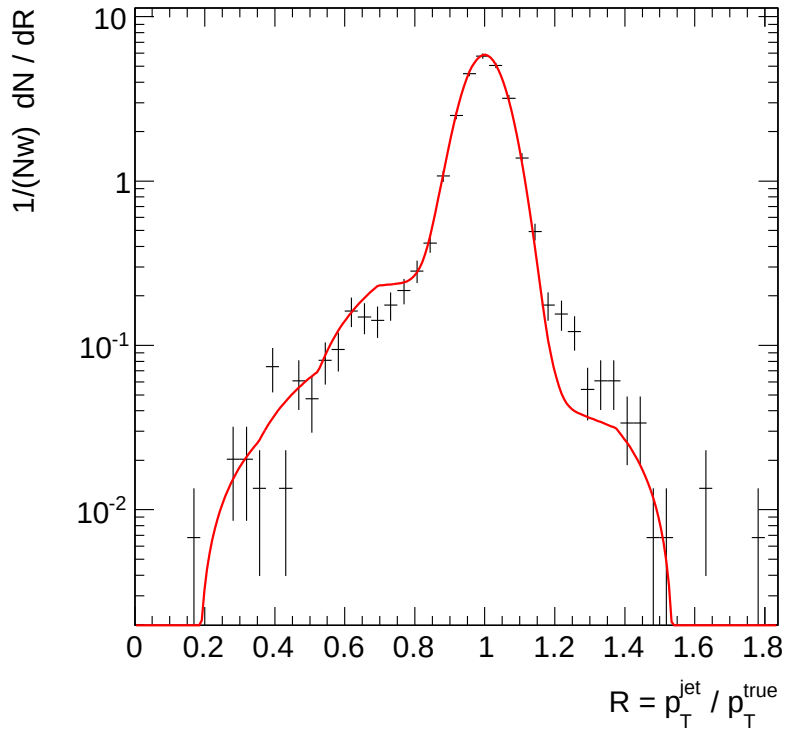


Fit results: separate fits for dijet and γ-jet events

- p_T^{true}-spectrum falling as $1/x^5$ and $p_T^{true} > 100$ GeV





- Start parameters like before (reasonable Gauss + flat step)
- Start parameters from previous fit with flat spectrum

Outlook

- Improvement of stability of fit for falling p_T spectrum
- Study of influence of functional form of p_T spectrum on fit (systematic errors)
- Fit of different $\hat{p}_T$ bins and study of parameter variation
- Study of influence of cuts on measured p_T on fit