

Fitting Jet Energy Scale Templates in Top Events

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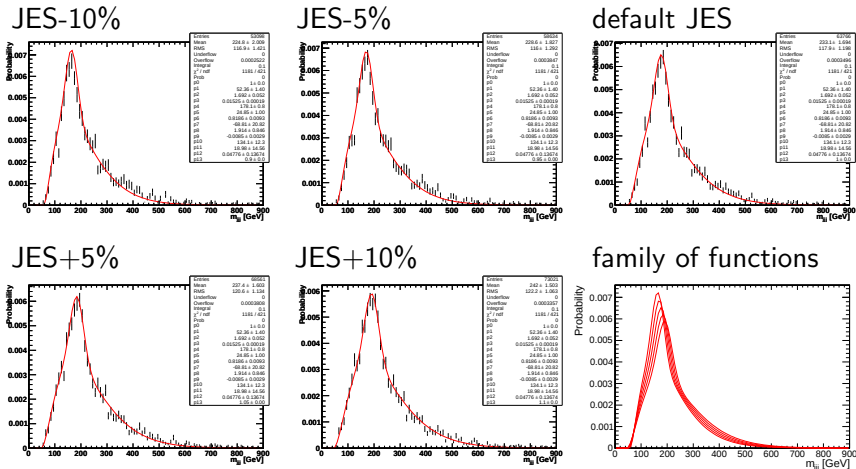
1. The Template Function
2. Fitted Template Function
3. JES Dependence of Template Parameters
4. Fitting Template to Data
5. Summary and Outlook

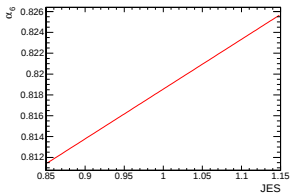
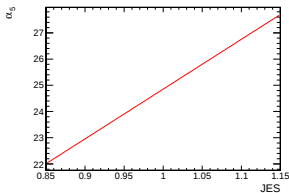
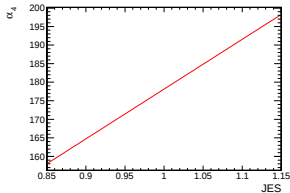
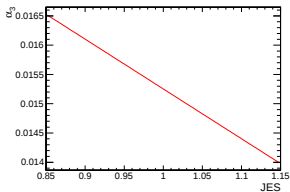
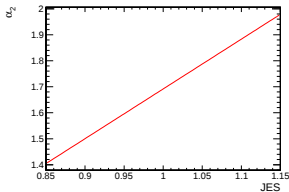
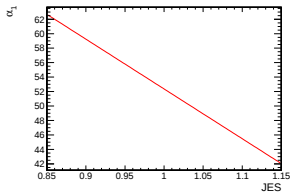
$$f = \alpha_6 f_1 + (1 - \alpha_6) f_2$$

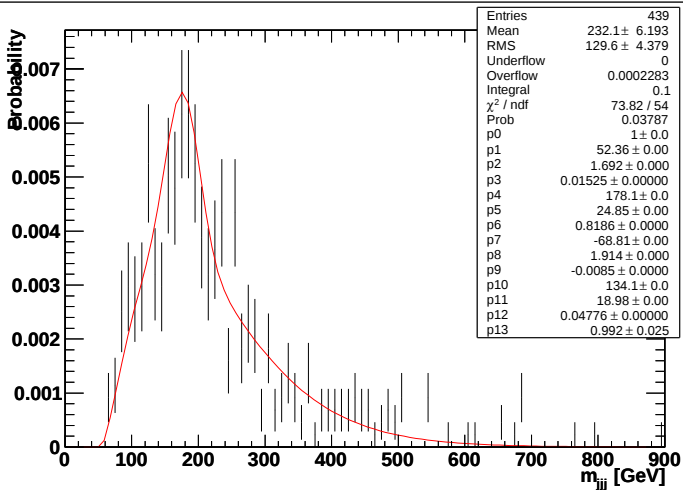
$$f_1 = \frac{\alpha_3^{1+\alpha_2}}{\Gamma(1+\alpha_2)} (x - \alpha_1)^{\alpha_2} \exp(-\alpha_3(x - \alpha_1))$$

$$f_2 = \frac{1}{\alpha_5 \sqrt{2\pi}} \exp\left(-\frac{1}{2}((x - \alpha_4)/\alpha_5)^2\right)$$

$$\alpha_1 = p_i + p_{i+6}(JES - 1)$$







Result:

- JES in $t\bar{t}$ = 0.981 ± 0.024 (signal fraction of 0.41)
- JES in $t\bar{t}$ = 0.992 ± 0.025 (signal fraction of 0.51)
- JES in $t\bar{t}$ = 1.004 ± 0.026 (signal fraction of 0.61)

Next steps:

- look at remaining fit issues (wrong n.d.f, problems setting range)
- study dependence on JER
- try to include top mass dependence
- use official JES uncertainty tool (p_T and η dependent) and vary JES by $\pm 1, 2, 3\sigma$
- include residual JEC
- look at PF and JPT
- study other systematics (pdf, ISR/FSR, ...)