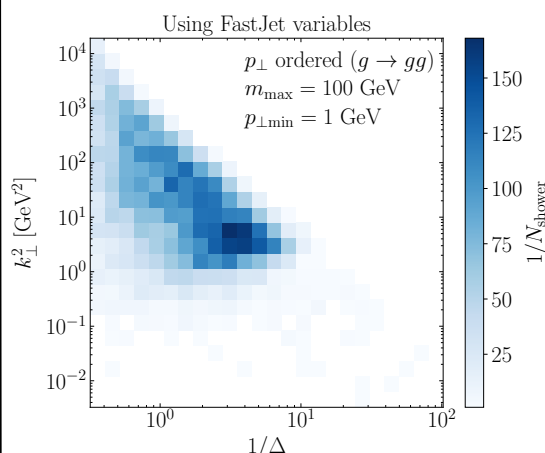
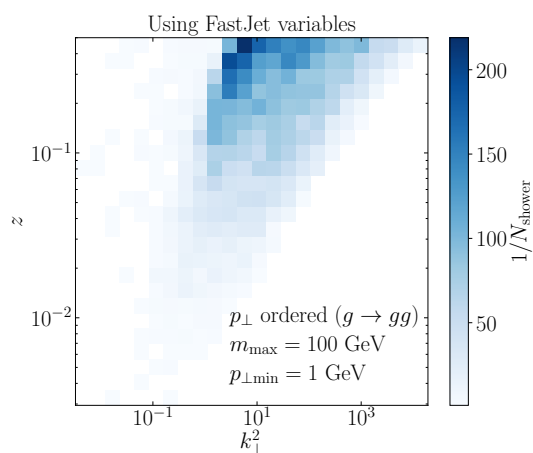
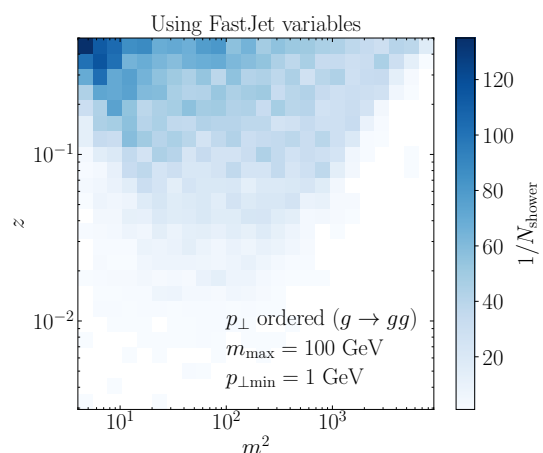


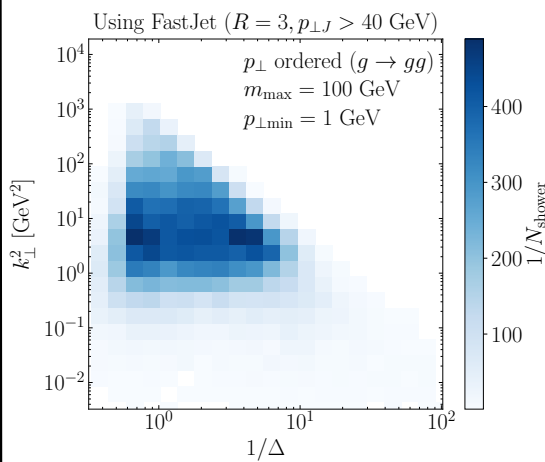
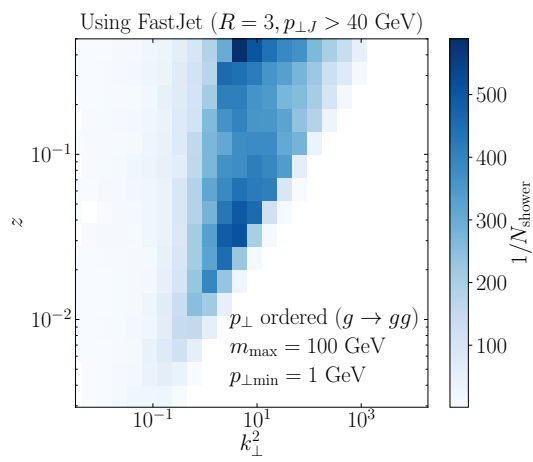
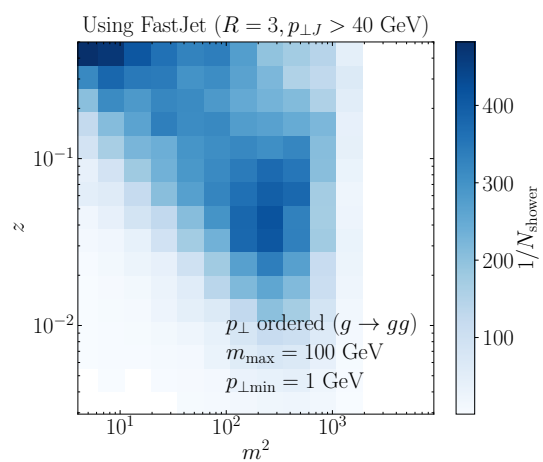
- 1<sup>st</sup> row: shower variables directly
- 2<sup>nd</sup> row: history with FJ variables
- 3<sup>rd</sup> row: final particles with FJ
- FastJet variables ( $a \rightarrow b + c$ )

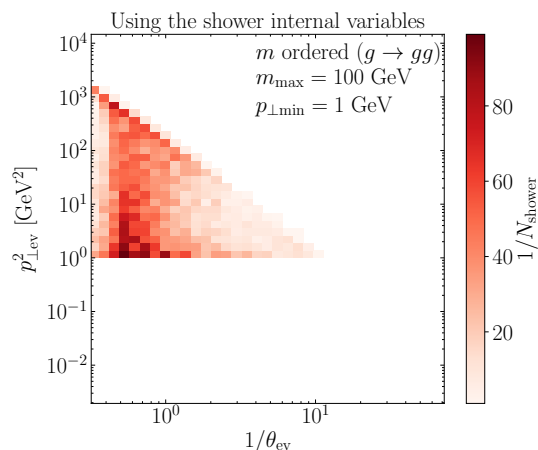
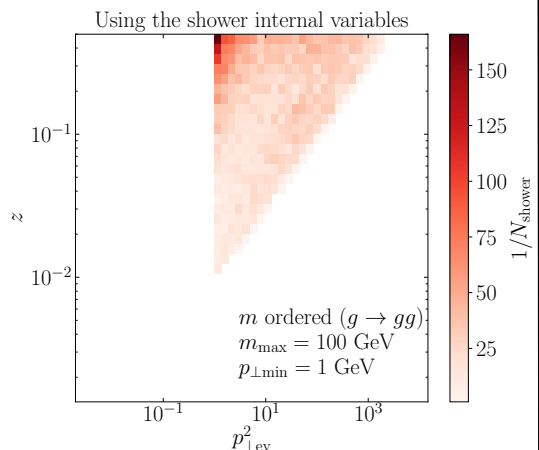
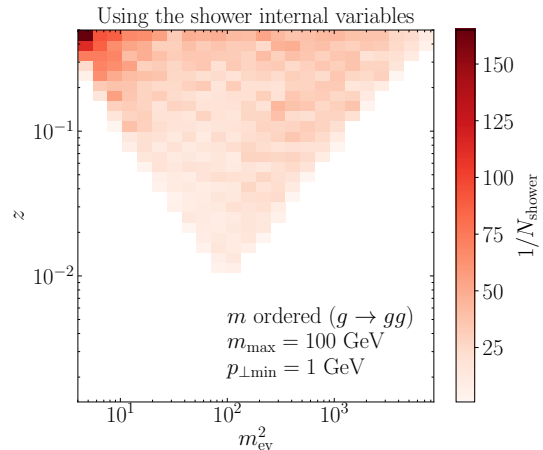


$$z = \frac{p_{bT}}{p_{cT} + p_{bT}}, \quad k_t = p_{bt} \Delta_{cb},$$

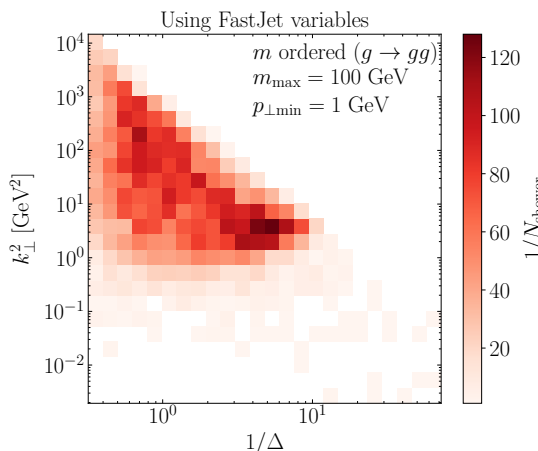
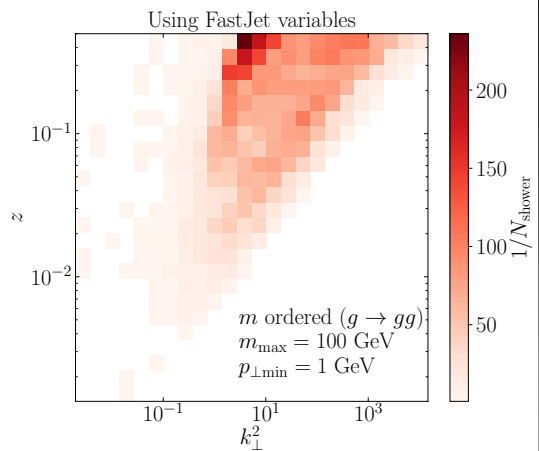
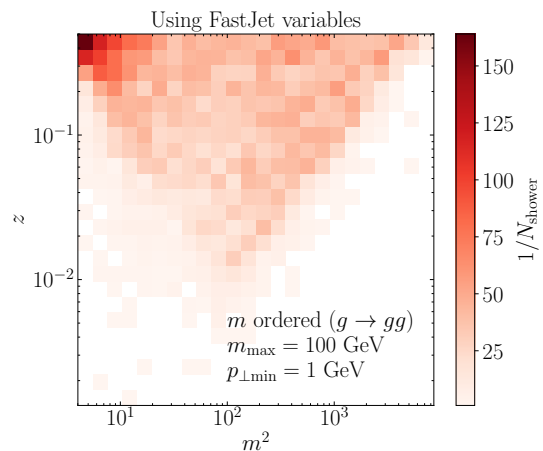
$$m^2 = (p_b + p_c)^2$$

- $m$  is well defined and Lorentz invariant in the first two rows, not in the 3<sup>rd</sup> (unambiguous history).
- $z$  is not Lorentz invariant, results differences in the first two rows.
- $k_t$  is not Lorentz invariant.





- 1<sup>st</sup> row: shower variables directly
- 2<sup>nd</sup> row: history with FJ variables
- 3<sup>rd</sup> row: final particles with FJ
- FastJet variables ( $a \rightarrow b + c$ )



$$z = \frac{p_{bT}}{p_{cT} + p_{bT}}, \quad k_t = p_{bt} \Delta_{cb},$$

$$m^2 = (p_b + p_c)^2$$

- $m$  is well defined and Lorentz invariant in the first two rows, not in the 3<sup>rd</sup> (unambiguous history).
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