• Assuming an event topology, we can constrain the mass space using measured momenta: visible particles, missing PT.
• “Minimal constraints“ equivalent to MT2 (Cheng & Han)

\[ p_1^2 = p_2^2 = \mu_N^2 \]

\[ (p_1 + p_a)^2 = (p_2 + p_b)^2 = \mu_Y^2 \]

\[ p_1^x + p_2^x = \mu_{\text{miss}}^x, \quad p_1^y + p_2^y = \mu_{\text{miss}}^y \]

Unbounded region, “kink”
2 visible particles per decay chain
(Cheng, Gunion, Han, Marandella, McElrath)

\[ p_1^2 = p_2^2 = \mu_N^2 \]
\[ (p_1 + p_3)^2 = (p_2 + p_4)^2 = \mu_X^2 \]
\[ (p_1 + p_3 + p_5)^2 = (p_2 + p_4 + p_6)^2 = \mu_Y^2 \]
\[ p_{1x}^2 + p_{2x}^2 = p_{miss}^x, \quad p_{1y}^y + p_{2y}^y = p_{miss}^y \]

500 events, no smearing
Correct masses
Bounded region “tip”
3 visible particles per decay chain  
(Cheng, Engelhardt, Gunion, Han, McElrath)

- More constraints, unknowns stay the same: p1, p2
- Combining two events and assuming the masses are the same, we obtain “discrete solutions”.

SPS1a, ideal case, 100 events  
SPS1a, realistic case, 1000 events (~700 signal events)