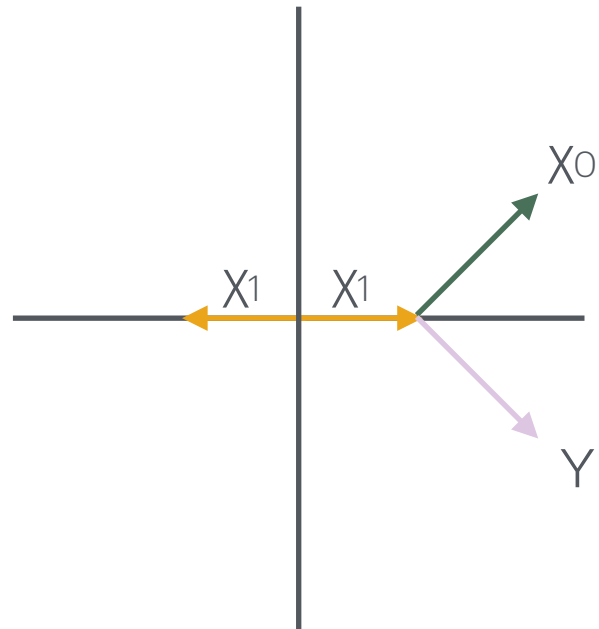


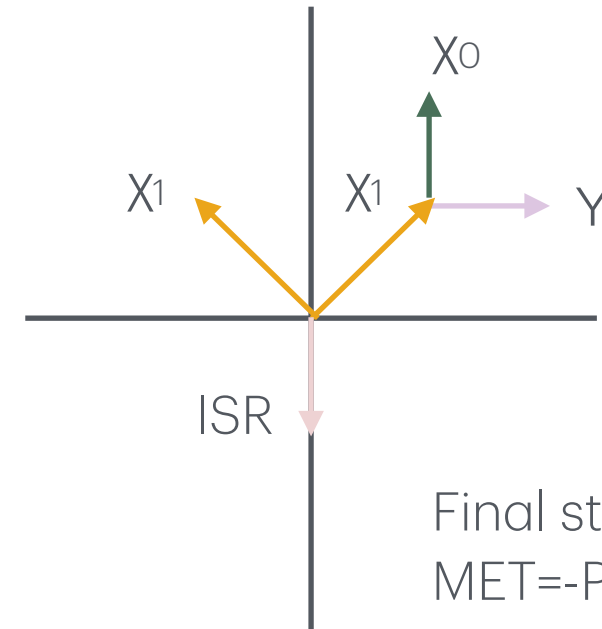
Event display $[X_1 \rightarrow X_0 + Y, \text{ one decay in } N, \text{ one in } N-1]$

N-1, no ISR



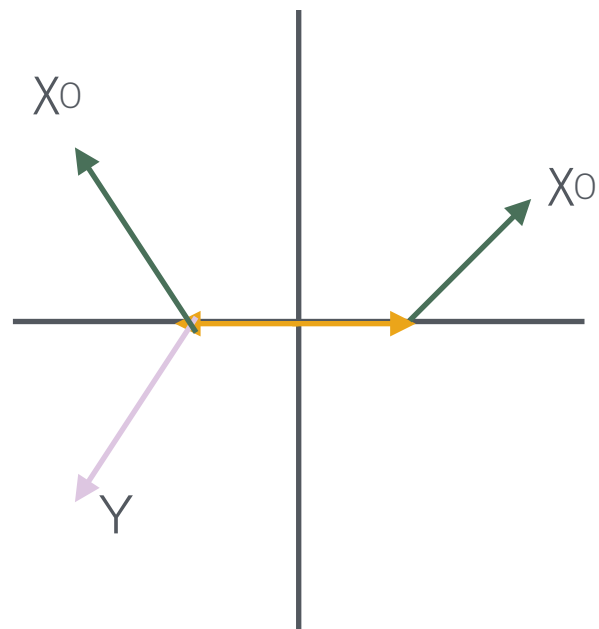
Final state: $Y + \text{MET}$
 $\text{MET} = -\text{PT}(Y)$
 [Y is the only visible particle!]

N-1, ISR



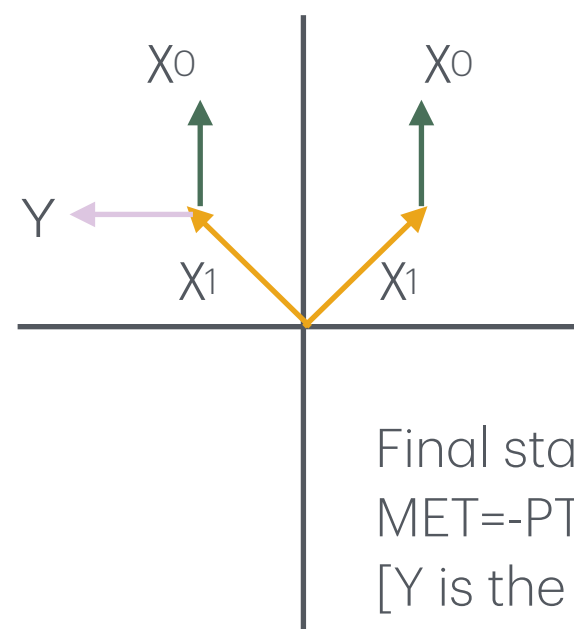
Final state: $Y + \text{MET} + \text{ISR}$
 $\text{MET} = -\text{P}(Y + \text{ISR})$

N, no ISR



Final state: $Y + \text{MET}$
 $\text{MET} = -\text{PT}(Y)$
 [Y is the only visible particle!]

N, ISR



Final state: $Y + \text{MET}$
 $\text{MET} = -\text{PT}(Y)$
 [Y is the only visible particle!]

Setting bounds

- When $p_T(Y)$ is low, both standard trigger and standard reco fail.
- MET searches would fail due to large MET trigger.
- Scalar searches: our mixing angle is safe from Higgs data fits
- But still, and thinking of $Y=bb$, depending on the lifetime we could have
 - i) Cal ratio search (for decays in HCAL):
<https://arxiv.org/pdf/2203.01009>
 - ii) hadronic jets in MS:
<https://arxiv.org/pdf/1811.07370> [a bit old, but...]
 - iii) Muon Showers (CMS study): <https://arxiv.org/pdf/2107.04838>

[I am particularly afraid of this one since they care about the energy of the decay products, not the p_T]