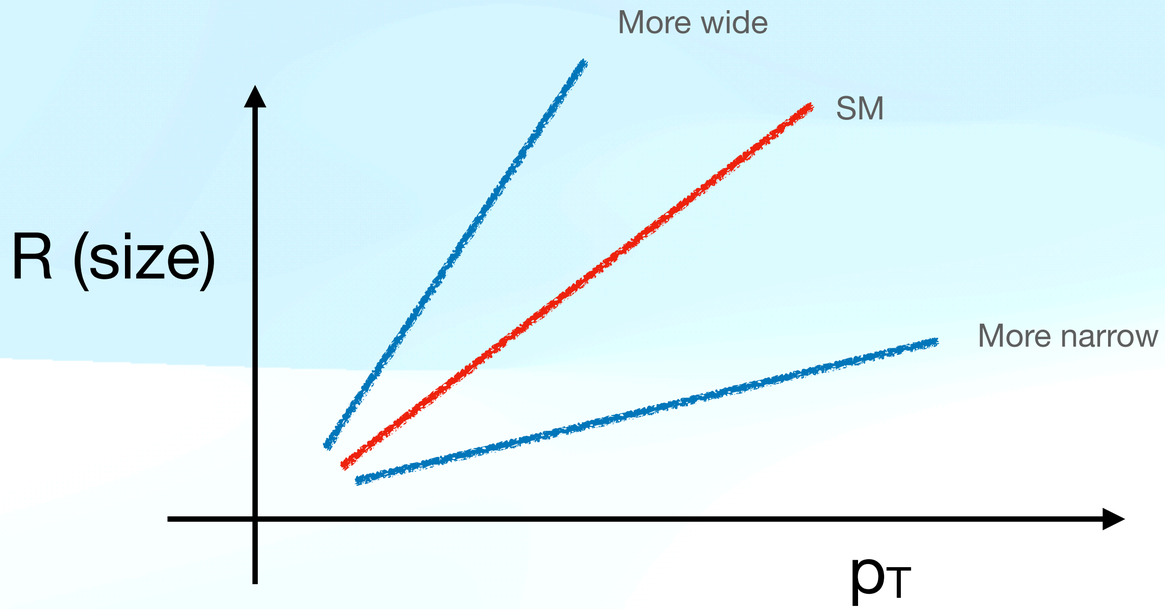
A simplified model of semi-visible jets

Many “realistic” parameters (N_C, N_F, Lambda, fragmentation params, etc …) would result in similar looking jets. Can we model jet properties directly without necessarily relying on scanning these?

Since we don’t know much about the dark confining sector, can we use a few parameters to make a reasonable range of jet properties

1. Spread of jet based on pT



This refers to the size of the jet in the dark side

Slope = 1 parameter

How much the jet spreads depends on multiple dark sector parameters esp. showering

Linear is first approximation, can be a more sophisticated curve.

2. Fraction of dark hadrons decaying visibly

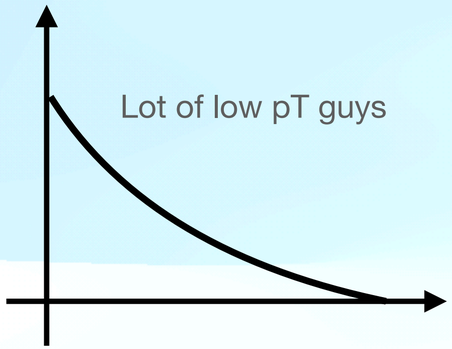
- The invisible fraction can just be a single chargeless scalar in the direction of the jet axis
- The visible fraction will need to be split between multiple hadrons.
- 1 parameter (r_{inv})

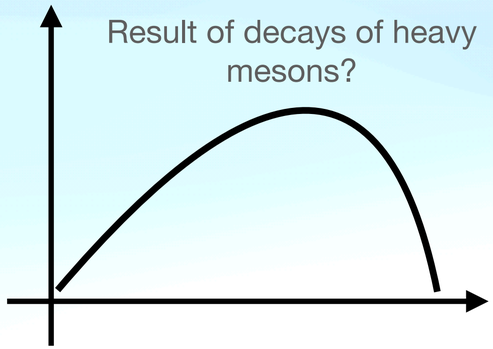
3. Mass of the visibly decaying hadron + decay (one at a time: qqbar, 3-body, etc.)

- 1 parameter (mass)
- Each decay is a separate “simplified model”

4. p_T Distribution of visibly decaying hadrons

- We can choose extreme situations





- Exponential and Gaussian could be first choices => 1-2 params
- Sum of pT of all the visibly decaying hadrons = $(1\text{-}r_{inv})\ p_T(\text{jet})$