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INTERACTING STRINGS IN MIN BIAS EVENTS

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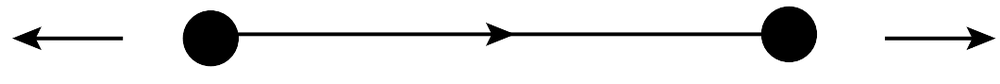
OUTLINE

- Casimir Scaling
- Repulsion & tension enhancement

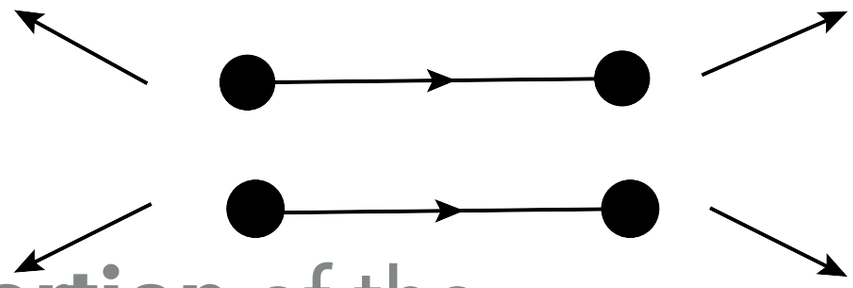
CASIMIR SCALING

- **Lattice results:**
  Potential **scales** with representation

$$\frac{V_r}{V_f} = \frac{C_{1,r}}{C_{1,f}}$$



- **Pheno:**
  Create **ropes** & string **tension scales** (Bierlich et. al - 1412.6259)



- PS & I aim to enhance string tension similiarly, but only use a **portion** of the increase. Model is formulated in **momentum space**

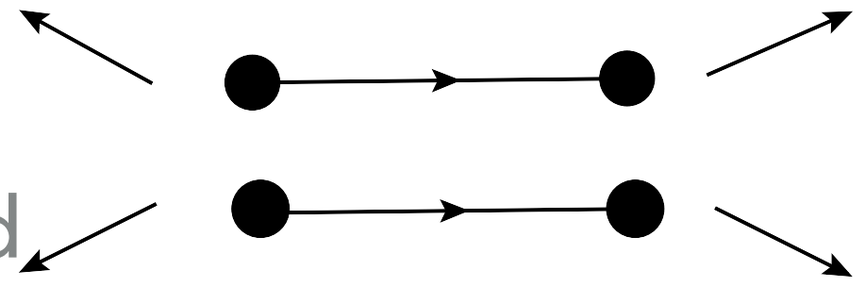
CASIMIR SCALING: A TALE OF TWO MANIFESTATIONS

- **Repulsion** (akin to shoving):
  Strings overlapping in **rapidity** space can repel **collectively**.

$$\Delta y = \ln\left(1 + \frac{m_s^2}{m_0^2}\right)$$

$$p_\perp^2 = \frac{rP_{\text{rep}}}{1 + rP_{\text{rep}}} m_0^2 \left(e^{\Delta y} - 1\right) \quad \text{where} \quad r = \frac{C_{r,1}}{C_{1,f}}$$

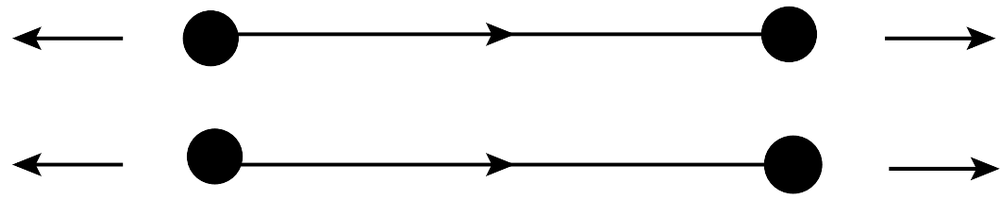
- **Tension** (akin to rope):
  Scale the **suppression** factors, and κ in the $p_\perp$ width



$$\kappa \to \frac{\kappa'}{\kappa} = 1 + r\left(1 - P_{\text{rep}}\right) \frac{p_{\perp,0}^2}{p_{\perp,0}^2 + p_{\perp,h}^2}$$

CURRENT IMPLEMENTATION

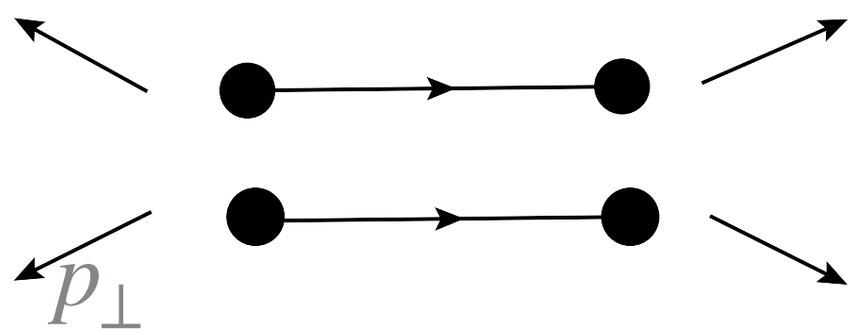
- **Repulsion (WIP)**:
  New class called **StringInteraction**
  Elastic scattered strings



Massless case:

Rescale 4-momenta, i.e. compress/shorten the string

$$p^{\mu} \rightarrow p^{*\mu} = f p^{\mu} \quad \text{where} \quad f = \sqrt{1 - \frac{p_{\perp}^2}{m^2}}$$



Boost to give the string an overall $p_{\perp}$

$$p_{\perp}^2 = \frac{rP_{\text{rep}}}{1 + rP_{\text{rep}}} m_0^2 \left(e^{\Delta y} - 1\right)$$

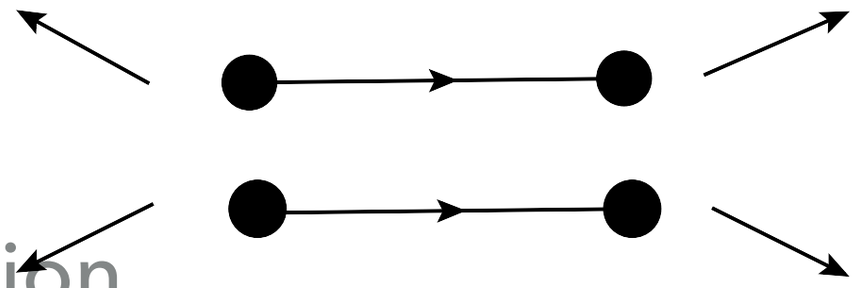
CURRENT IMPLEMENTATION

- **Repulsion** (notes):

  Stay in **momentum-based** description

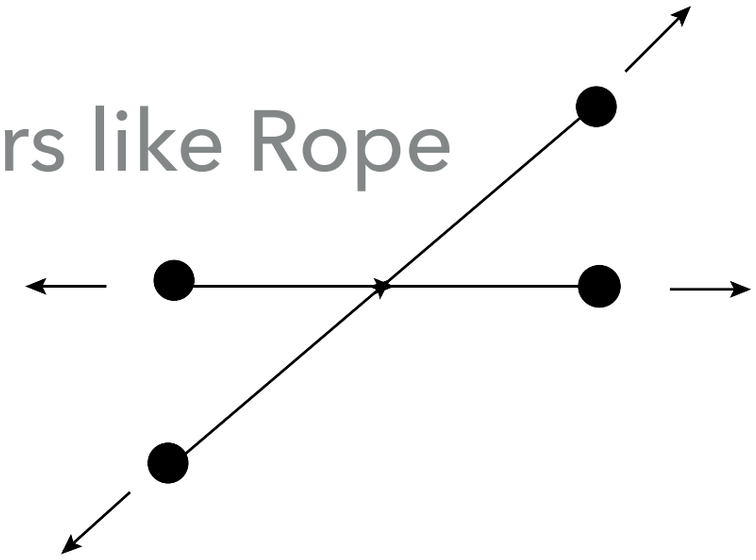
  Do not resolve internal structure of strings

  Global axis for an event, which determines the longitudinal direction



CURRENT IMPLEMENTATION

- **Tension:**
  Recalculate the suppression factors like Rope
  New class in Frag. Flav called
  FlavEnhanced



Uses the same idea as Nadine & Torbjorn's thermal
Near String Pieces

$$\kappa \to \frac{\kappa'}{\kappa} = 1 + r\left(1 - P_{\text{rep}}\right)\frac{p_{\perp,0}^2}{p_{\perp,0}^2 + p_{\perp,h}^2}$$

THINGS TO SOLVE BEFORE WE ARE DONE

- **Repulsion direction**
- **Thermal limit of repulsion**