FH Fellow Meeting

Lais Schunk – 27 February 2017

About Me

Lais Schunk

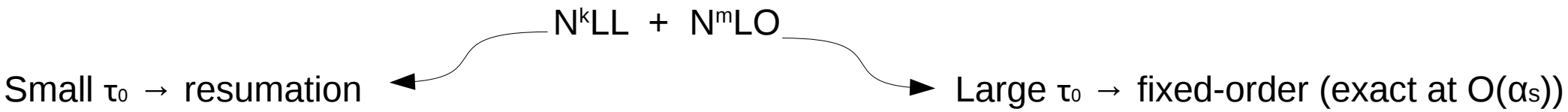
- I am Brazilian
- Started my undergrad in Physics at University of Sao Paulo, Sao Paulo, Brazil
- Finished my undergrad at Ecole Polytechnique, Palaiseau, France
- Masters in Theoretical Physics at Ecole Normale, Paris, France
- PhD in “Understanding Jet Substructure at the LHC” at IPhT – CEA, Saclay (advisor : Gregory Soyez)
- Started **DESY fellowship in October 2017** in the Theory Group

My Current Work

Resummation techniques and Matching (focusing on QCD and Phenomenology)

- Situations involving very different energy scales (like the LHC) → Need **resummation procedure**
  e.g. calculating 0-jettiness (τ_0) for Drell-Yan production

- In order to have a complete description we need a **matching procedure**

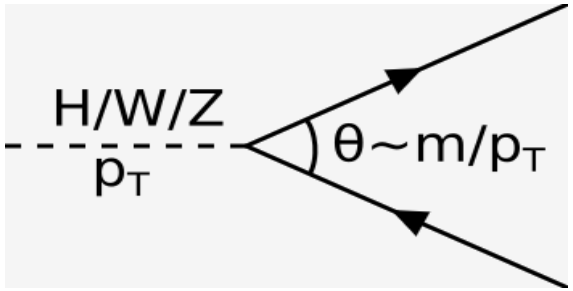


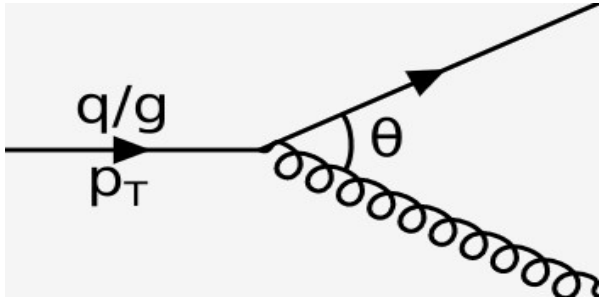
- Matching procedure is non-trivial → need to **avoid double counting** !
- Also, one might want to attach a parton shower → hadronization and non-perturbative effects
- Best possible prediction : **Fixed-order + Resum + Parton Shower**
- See GENEVA Monte-Carlo framework

My Current Work

Jet Substructure

- In the LHC we have the production if **boosted heavy particles** (transverse momentum >> mass)
  → All disintegration products clustered in a single jet





- How do we separate signal jets (W/Z/H bosons or top) from QCD background?
  → **Jet substructure techniques** → explore the **internal dynamics of the jet**

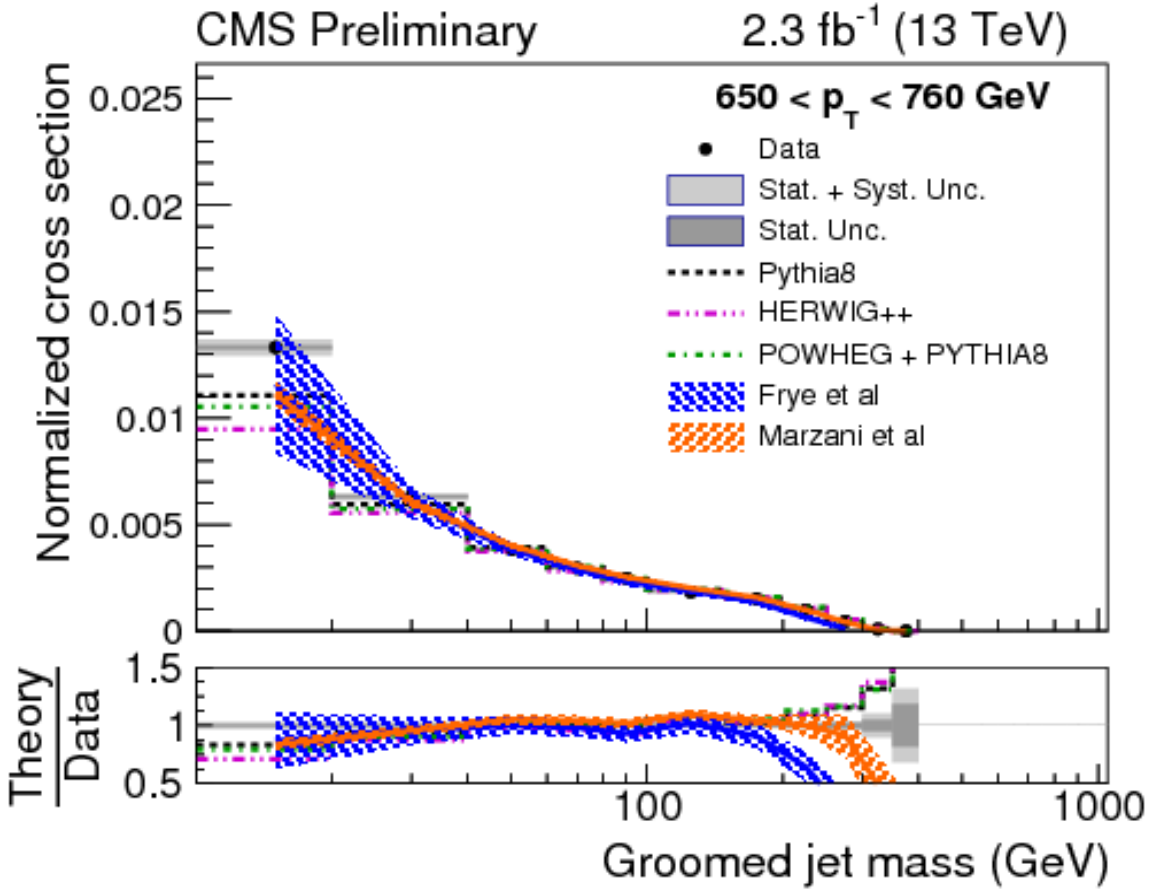
- Some examples : N-subjettiness, SoftDrop, modified MassDrop Tagger, pruning …

- Advantages of using an analytical approach
  → Understand existing tools and **develop new ones**
  → Reliable **uncertainty bands**

My Favourite Plots

Linking theory and experiment

Groomed jet mass distributions : comparison between experiment (CMS) and theoretical calculations



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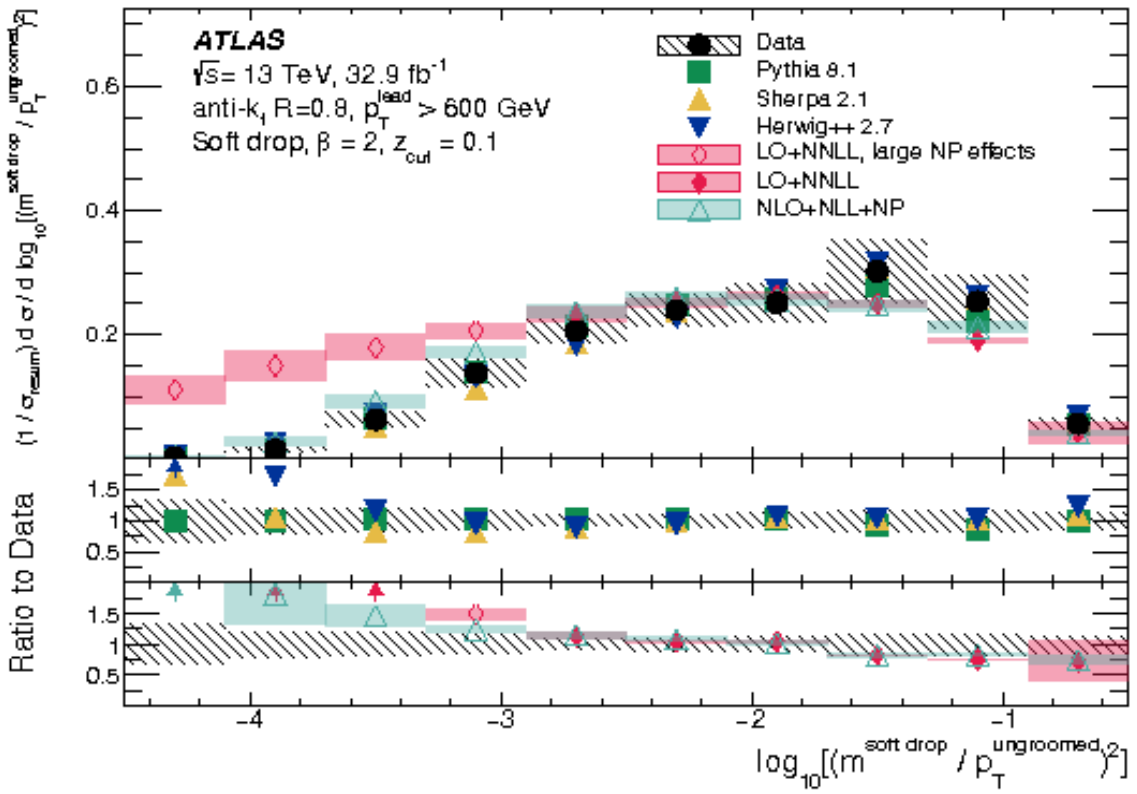

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