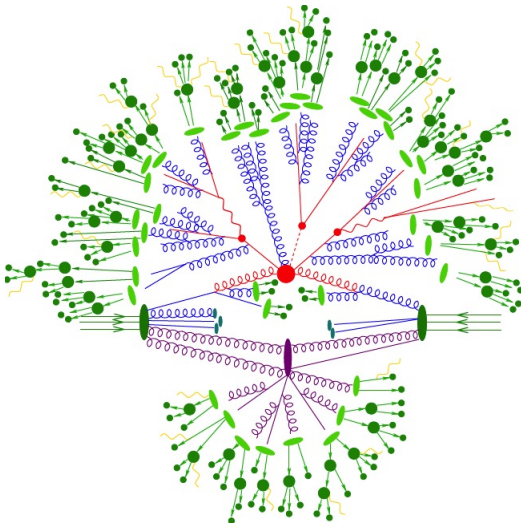


Hadronic Rescattering in Pythia

Marius Utheim

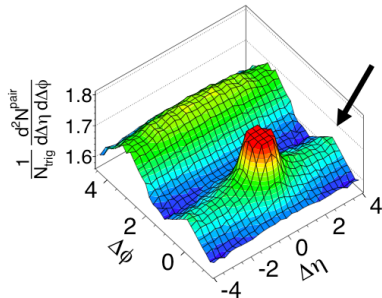
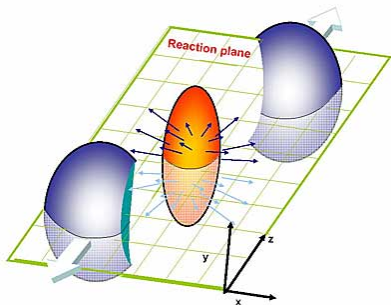
Supervisor: Torbjörn Sjöstrand

What is rescattering?



Why is rescattering important?

Phenomena: Flow, jet quenching, strangeness enhancement



What causes these phenomena in pA and pp collisions?

Rescattering should contribute somehow

Outline

Motivation

The Rescattering Algorithm

Preliminary results

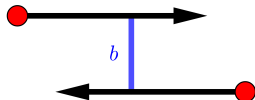
The Rescattering Algorithm

There are three questions that need to be answered:

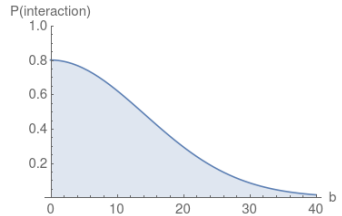
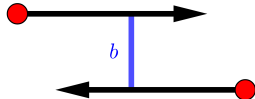
1. When do two hadrons interact?
2. What happens when hadrons collide at low energies?
3. Looking at the whole event, which hadrons interact with each other?

1. When do two hadrons collide?

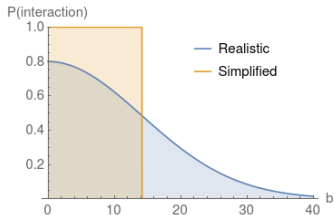
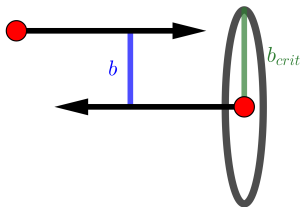
1. When do two hadrons collide?



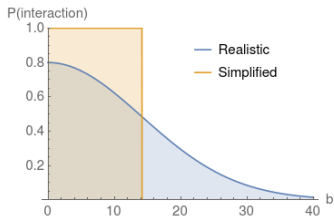
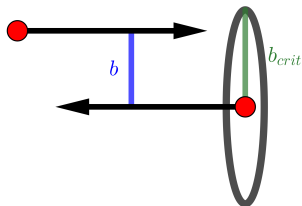
1. When do two hadrons collide?



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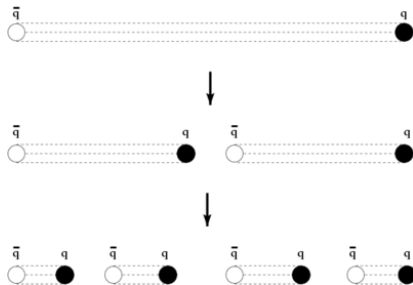
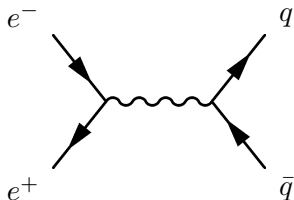


The particles interact if $b < b_{crit} = \sqrt{\sigma}/\pi$

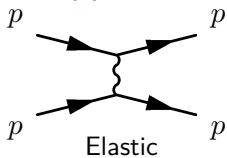
This means we need to know the cross section σ .

2. What happens when hadrons collide?

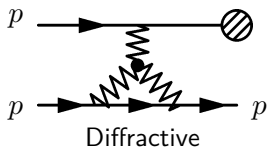
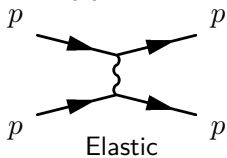
In most of the processes, the mechanism for creating new particles is the **Lund string model**.



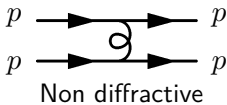
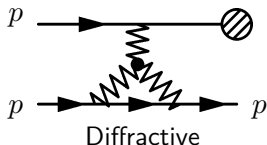
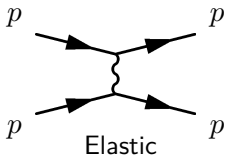
2. What happens when two hadrons collide?



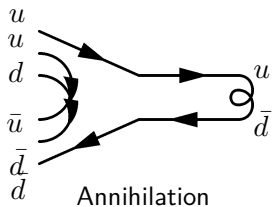
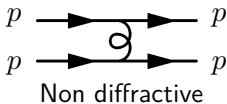
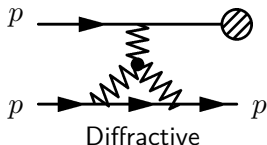
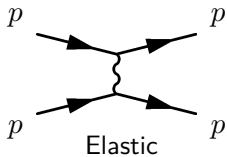
2. What happens when two hadrons collide?



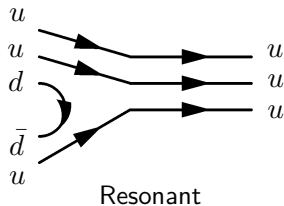
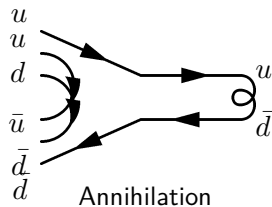
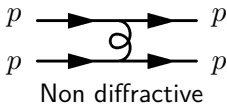
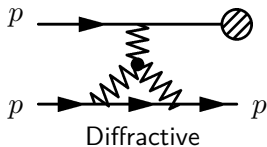
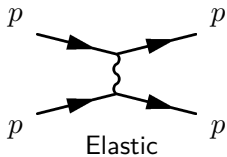
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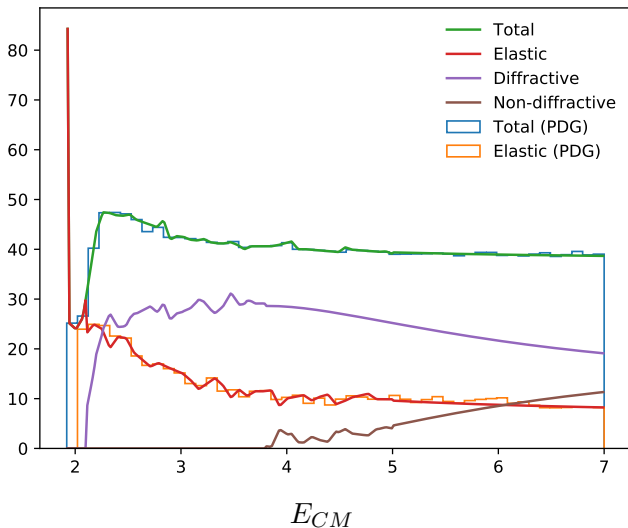
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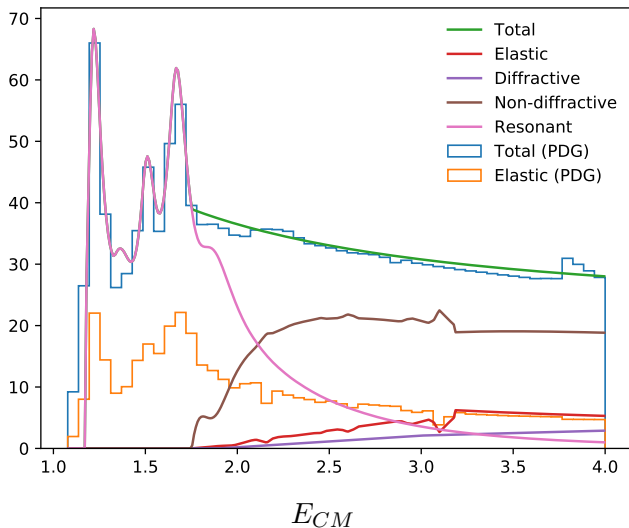
2. What happens when two hadrons collide?



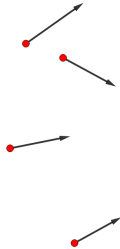
pp cross sections



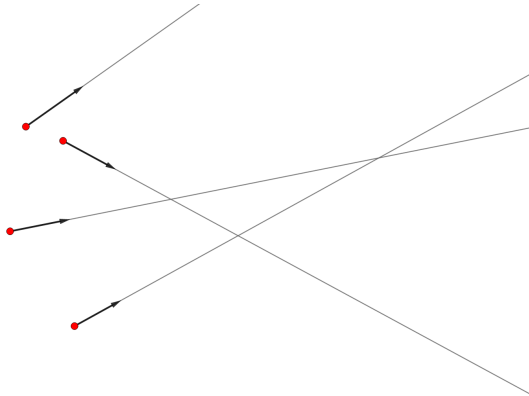
π^+p cross sections



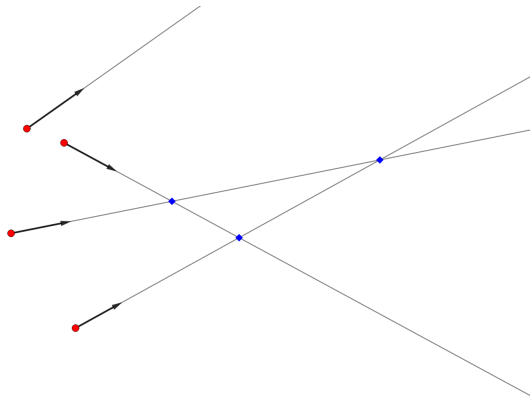
3. Looking at the whole event



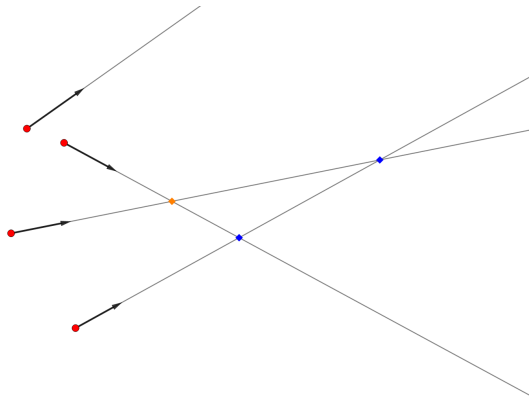
3. Looking at the whole event



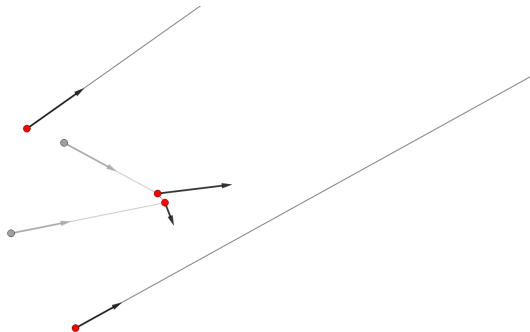
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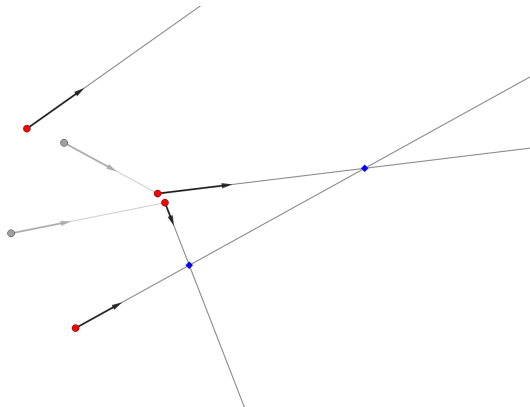
3. Looking at the whole event



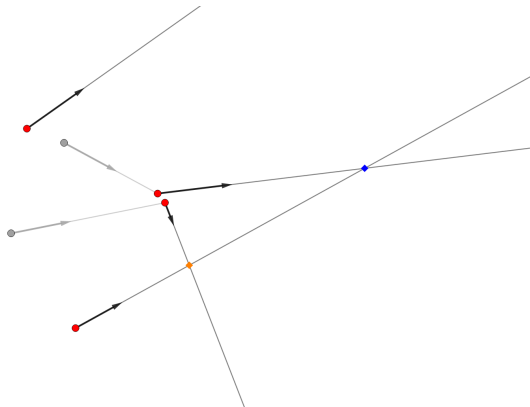
3. Looking at the whole event



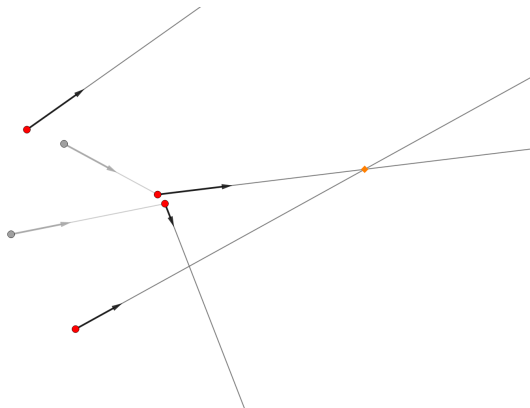
3. Looking at the whole event



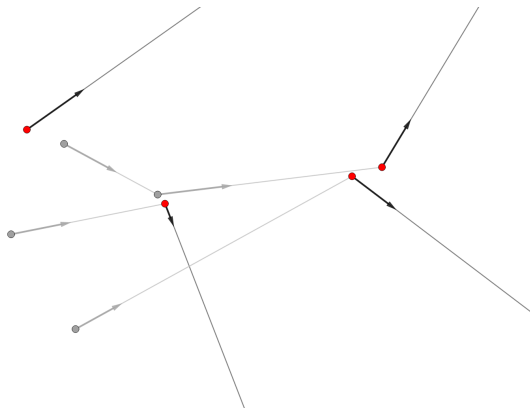
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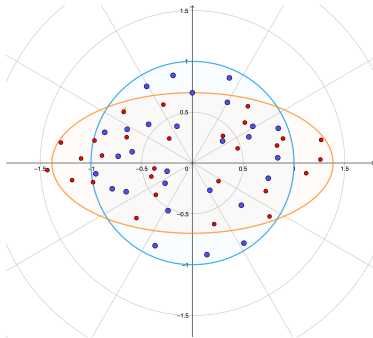
Outline

Motivation

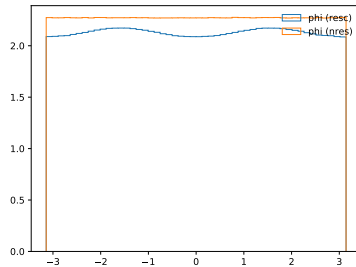
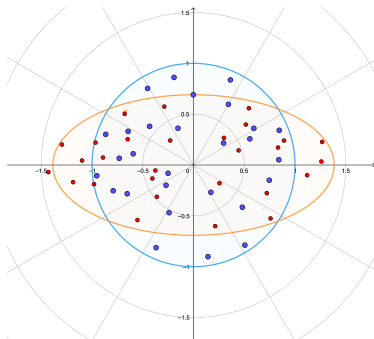
The Rescattering Algorithm

Preliminary results

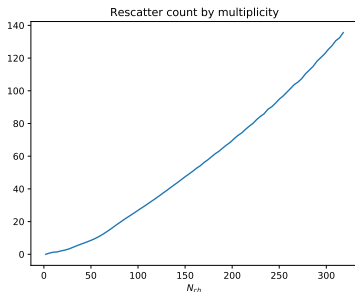
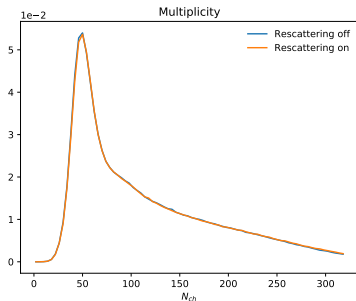
Preliminary results - Flow



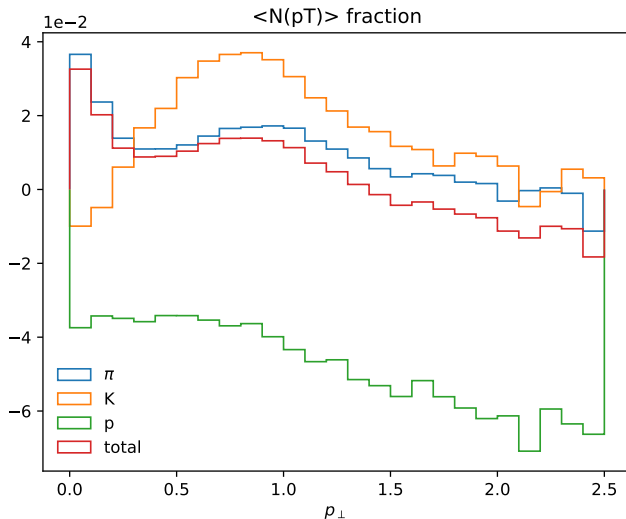
Preliminary results - Flow



Preliminary results - Multiplicity



Preliminary results - Pion wind



Outlook

- ▶ Code is nearly complete, and will hopefully be ready for release within the next few months.
- ▶ The biggest question is: How well does rescattering explain observed phenomena like flow and jet quenching? Preliminary results show that rescattering can contribute to several of the expected phenomena.
- ▶ When the first version is done, the natural next step is looking at rescattering in Angantyr