Charged Particle spectra in different final states at 13TeV

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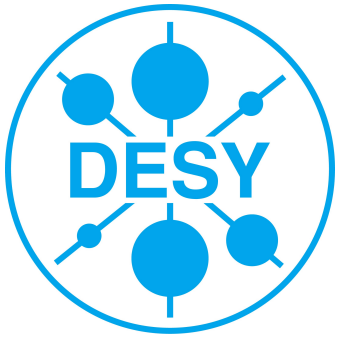
Physics & Cookies
22/08/2016



QCD

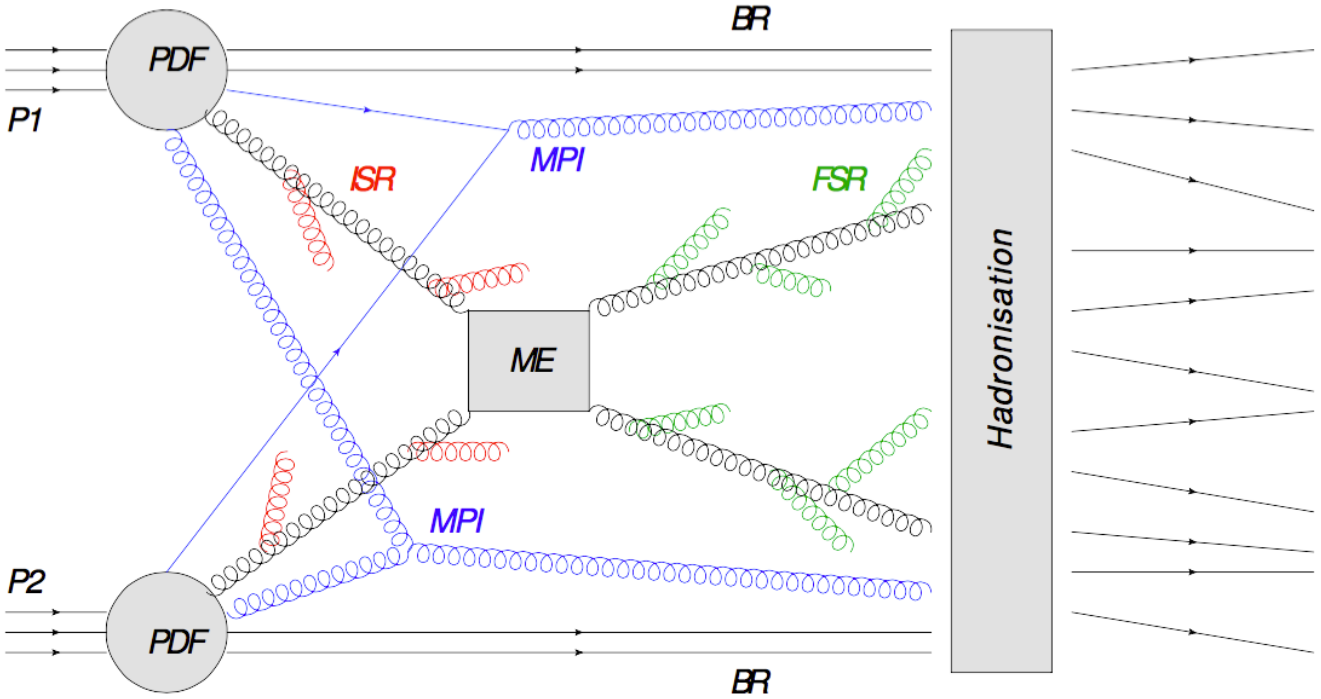
All information of the strong interactions is encoded in the QCD Lagrangian

- At high momentum transfer it can be calculated in a perturbative manner.
- At small momentum transfer the perturbation theory cannot be applied:
  - Use of phenomenological models.
  - Constrain by fits to data.

QCD: at small scale

What has to be calculated in a phenomenological manner includes:

- Initial and Final State Radiation (ISR/FSR)
- Multi Parton Interactions (MPI)
- Hadronization



QCD: at small scale

What has to be calculated in a phenomenological manner includes:

- Initial and Final State Radiation (ISR/FSR)
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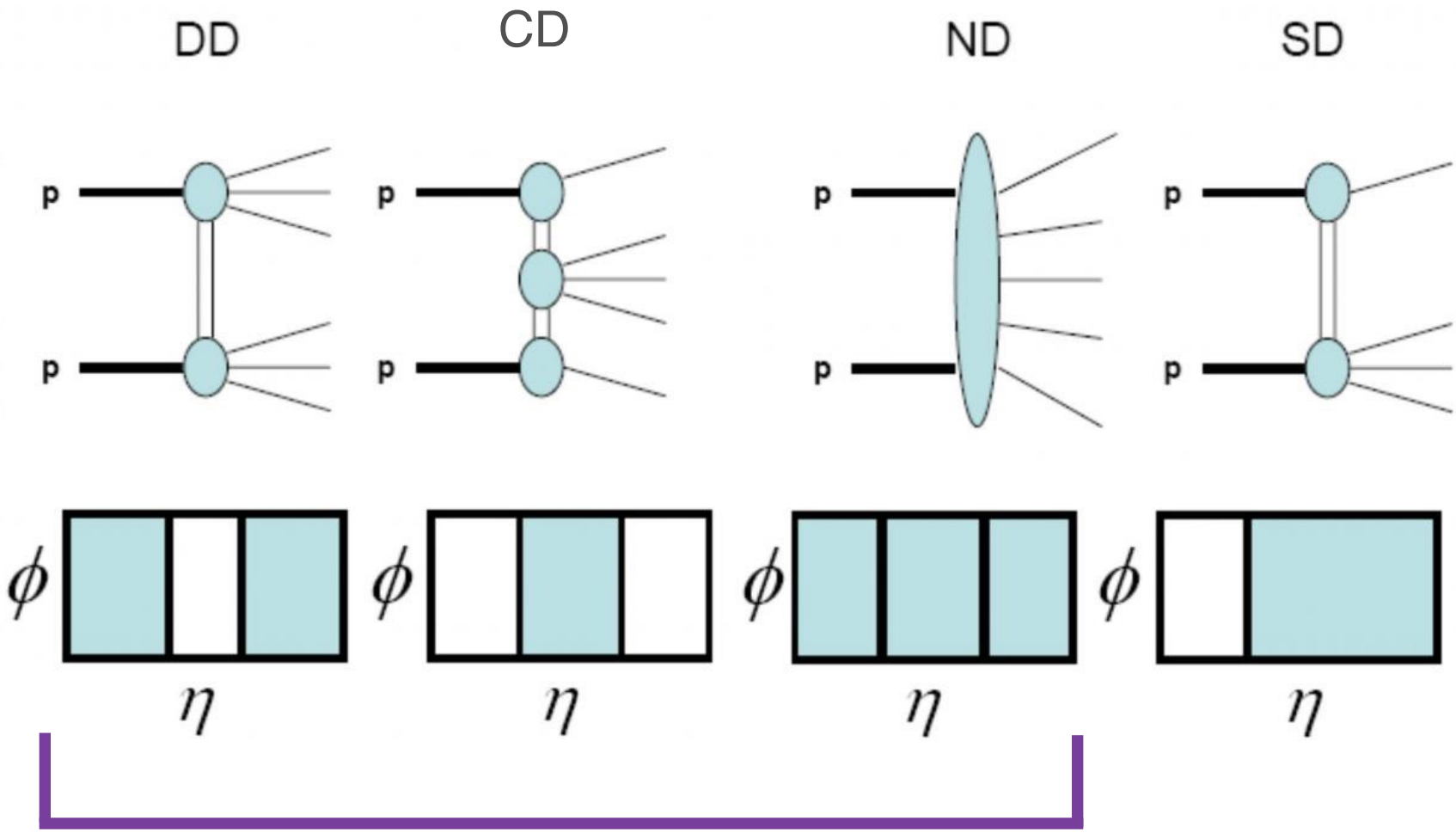
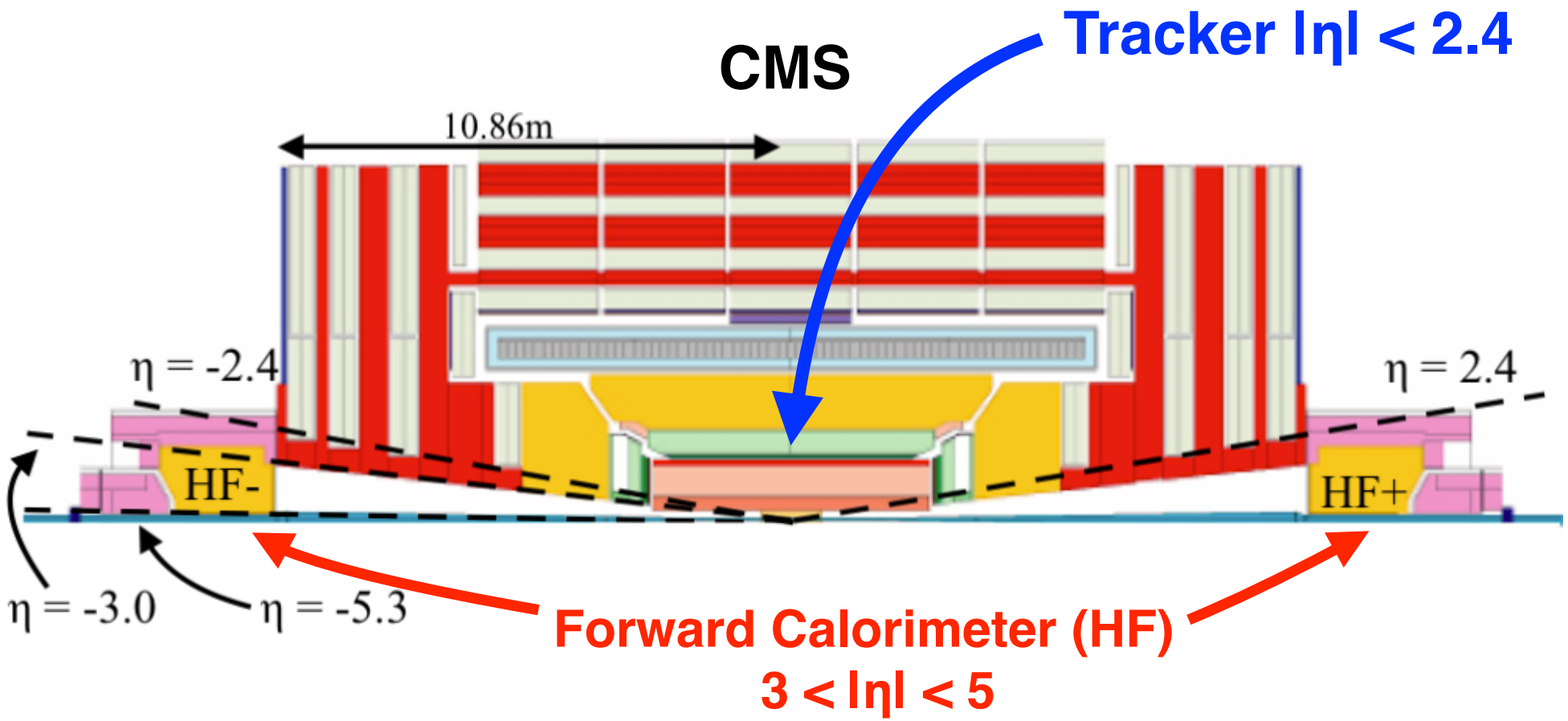
The idea:
Constrain the parameters of these phenomenological models in a more “differential” way
—> Different diffractive processes

Inelastic components



Non-Single Diffractive (NSD)

The Compact Muon Solenoid (CMS) detector



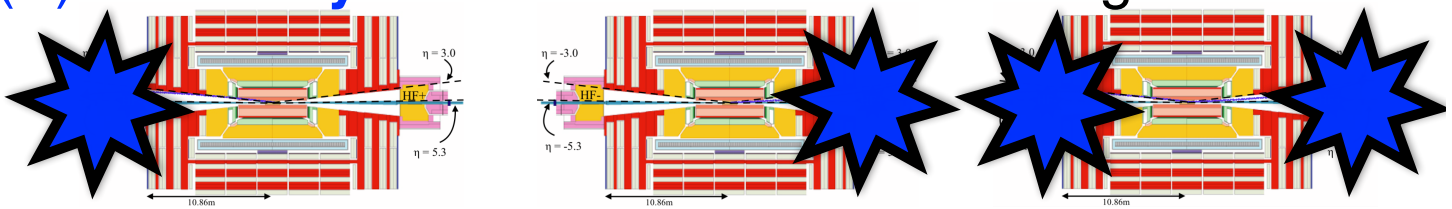
- Trigger: **both** beams crossing at the Interaction Point (IP)
- Activity in the **Forward Regions** (HF)

Phase space definition at stable particle level

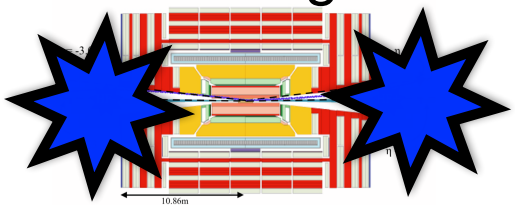
(A) At least 1 charged particle $\begin{cases} p_T > 0.5 \text{ GeV} \\ |\eta| < 2.4 \end{cases}$

- ✦ **Activity**: at least 1 particle with E > 5 GeV
- ✦ **Veto**: no particle with E > 5 GeV

- **Inclusive**: (A)
- **Inelastic enhanced**: (A) **+ Activity** in **at least one** Forward Region



- **NSD enhanced**: (A) **+ Activity** in **both** Forward Regions



- **SD enhanced**: (A) + **Activity** in one Forward Region **and Veto** in the other side