

# Chapter 7 status: cosmic ray physics, multiplicities, correlations and spectra

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**LHC Working Group on Forward Physics and Diffraction**

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# Yellow report outline

## **Chapter 7: cosmic ray physics, particle multiplicities, correlations and spectra – Tanguy Pierog**

Short overview

### ***Cosmic ray physics, MC tuning....***

Proton Oxygen and proton lead to tune MC –

Results and prospects – *LHCf*

*Alice?*

### ***Particle multiplicity***

Charged particle, forward energy, identified particle spectra -*T. Martin*. For AFP at  $\beta^*=0.55\text{m}$  (collision optics) and ALFA at 0.55 and 90m.

Charged + neutral spectra. Status + plans, *CMS/Totem*

Forward energy flow and charged multiplicity – *LHCb*

# Cross-sections and Pile-up

- **Min bias type of analysis**
  - ➔ high cross section processes
  - ➔ need low luminosity and low pile-up
- **All experiments were contacted**
  - ➔ No numbers available yet
    - ➔ try to have numbers before 15th of march

# Confirmed Yellow Report Contributions

- **ATLAS (T. Martin) : presentation during this workshop**
  - ➔ Charged particle correlations with AFP and ALFA
- **LHCf (T. Sako) : presentation at the Trento Workshop**
  - ➔ Energy spectra of neutral particles (gamma, neutral pion, neutron...)
- **CMS+TOTEM (V. Avati, K. Oesterberg, R. Ulrich) : presentation during this workshop**
  - ➔ forward charged particle multiplicity and multiplicity correlations measurements
  - ➔ energy spectra with CASTOR(+T2 ?)

# Confirmed Yellow Report Contributions (2)

- **LHCb (D. Volyansky and P. Collins) :**  
**presentation during this workshop**
- **Cosmic Ray and MC tuning (D. Berge, R. Engel, T. Pierog and R. Ulrich) :**  
**presentation at the Trento workshop**
  - ➔ motivations from CR physics (intro)
  - ➔ need for p-O beam
  - ➔ comparison between EPOS LHC and QGSJETII-04

# Contribution to be confirmed

- **ALICE**

- ➔ people interested

- ➔ participation to chapter 7 sent to Physics coordinator

# Summary

## Chapter 7: cosmic ray physics, particle multiplicities, correlations and spectra

### - Tanguy Pierog

✓ Short overview D. Berge, T. Pierog

### *Cosmic ray physics, MC tuning....*

✓ Proton Oxygen and proton lead to tune MC – D. Berge, T. Pierog, R. Engel, R. Ulrich

✓ Results and prospects – *LHCf* T.Sako

~ *Alice?*

### *Particle multiplicity*

✓ Charged particle, forward energy, identified particle spectra – T. Martin. For AFP at  $\beta^*=0.55\text{m}$  (collision optics) and ALFA at 0.55 and 90m.

✓ Charged + neutral spectra. Status + plans, *CMS/Totem* V. Avati, K. Oesterberg, R. Ulrich

✓ Forward energy flow and charged multiplicity – *LHCb* D. Volyanskyy and P. Collins