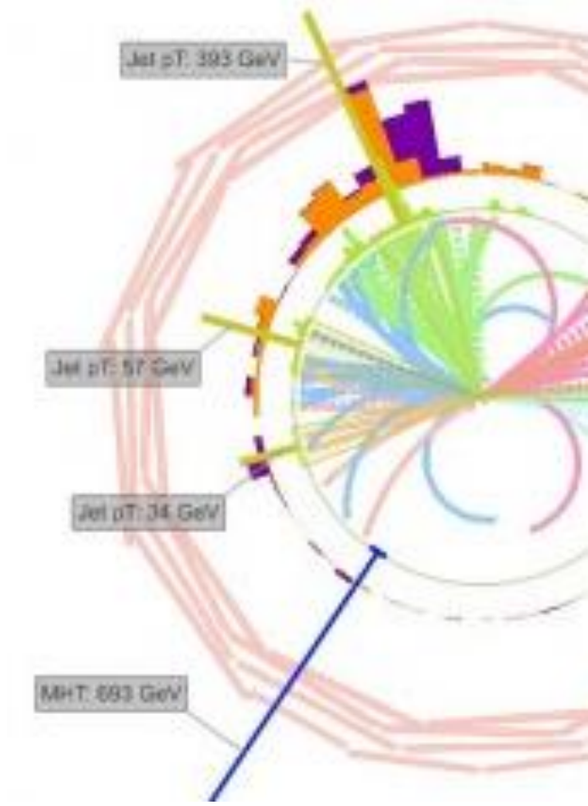
CBPF
Centro Brasileiro de Pesquisas Físicas

CMS

Minimum Bias Tuning with Professor Phase I Brief Status Report



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CERN

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Rio de Janeiro, Brazil

Introduction

- Dealing with **Minimum Bias events** (Non-Single Diffractive - **NSD** - interactions)

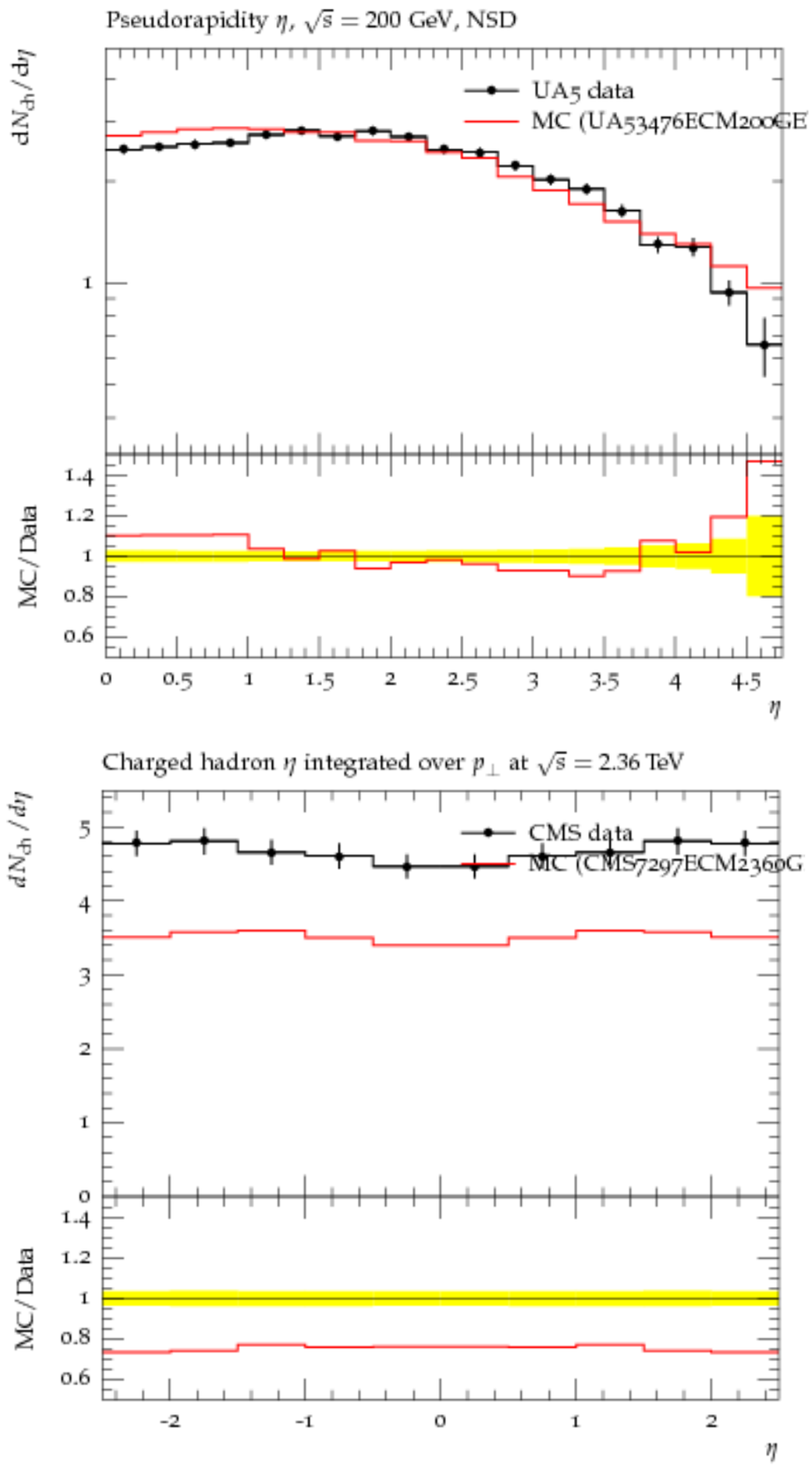
- Observable: **dN/dη** (Charged particle density distributions for NSD) plotted against η (pseudorapidity)

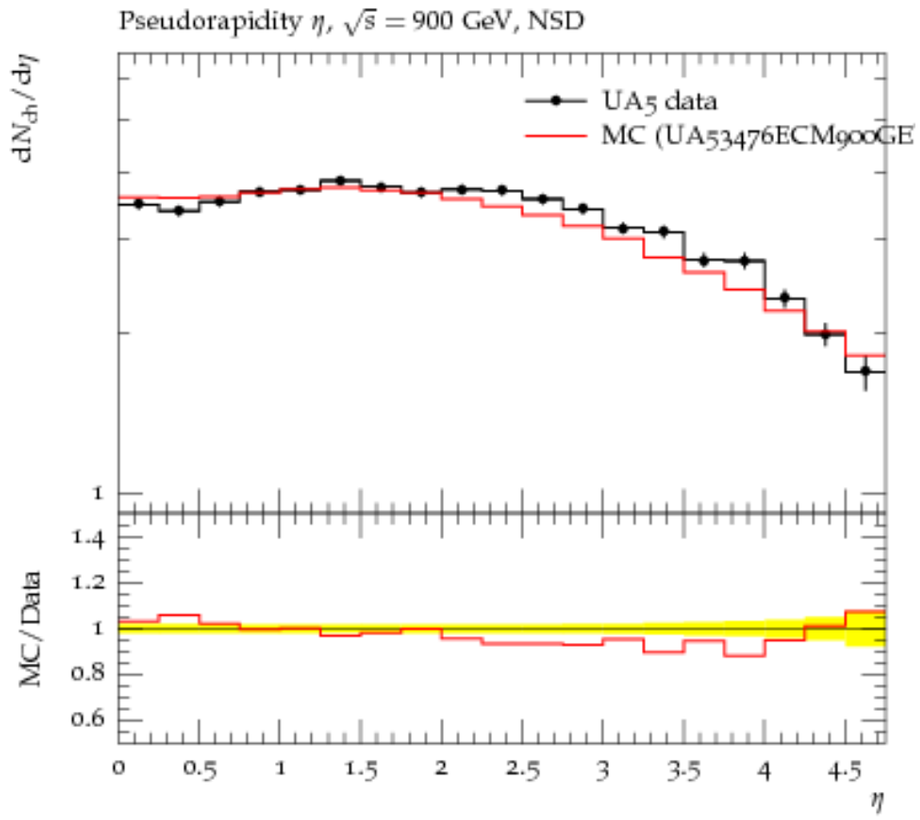
- **Pythia6 Z2*LEP** tuned with Professor (Z2*LEP's block inserted at Z2; Samantha's last talk)

- **Ptmin (Cut-off) Parameters** :
  - PARP(82) = 0.90 2.5 ! pt cutoff for multiparton interactions
  - PARP(90) = 0.15 0.3 ! Multiple interactions: rescaling power

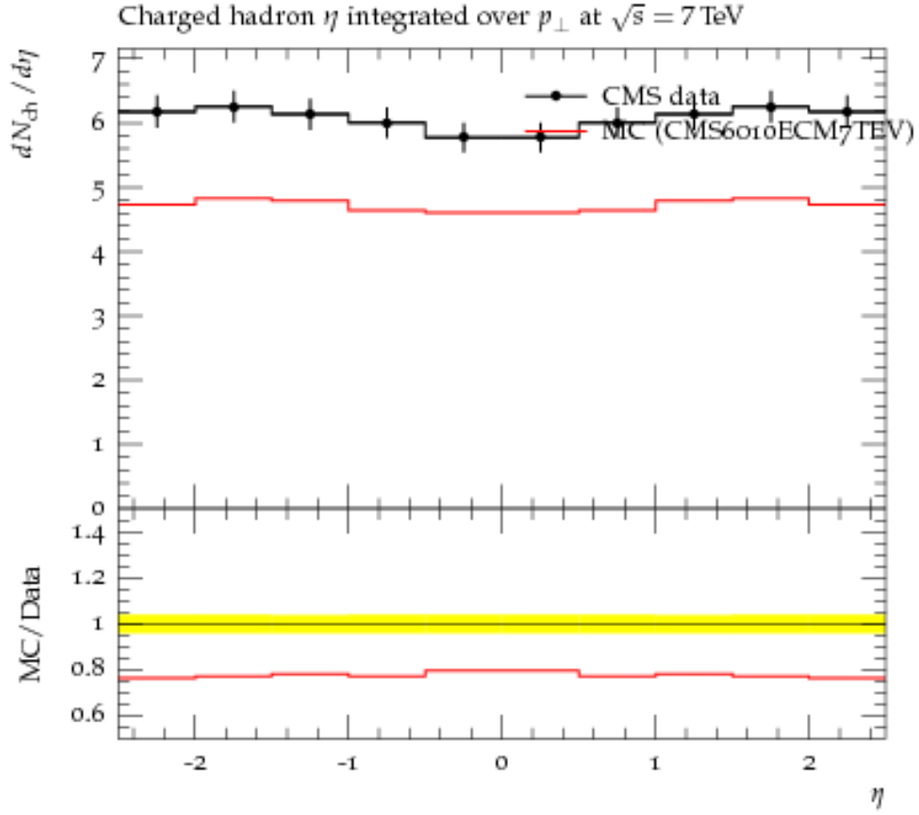
- **Analysis**:
  - CMS_2010_S8547297 (900 and **2360 GeV**)
  - CMS_2010_S8656010 (**7000 GeV**)
  - UA5_1986_S1583476 (**200 GeV and 900 GeV**)
  - CDF_1990_S2089246 (1800TeV)

Rivet Plots

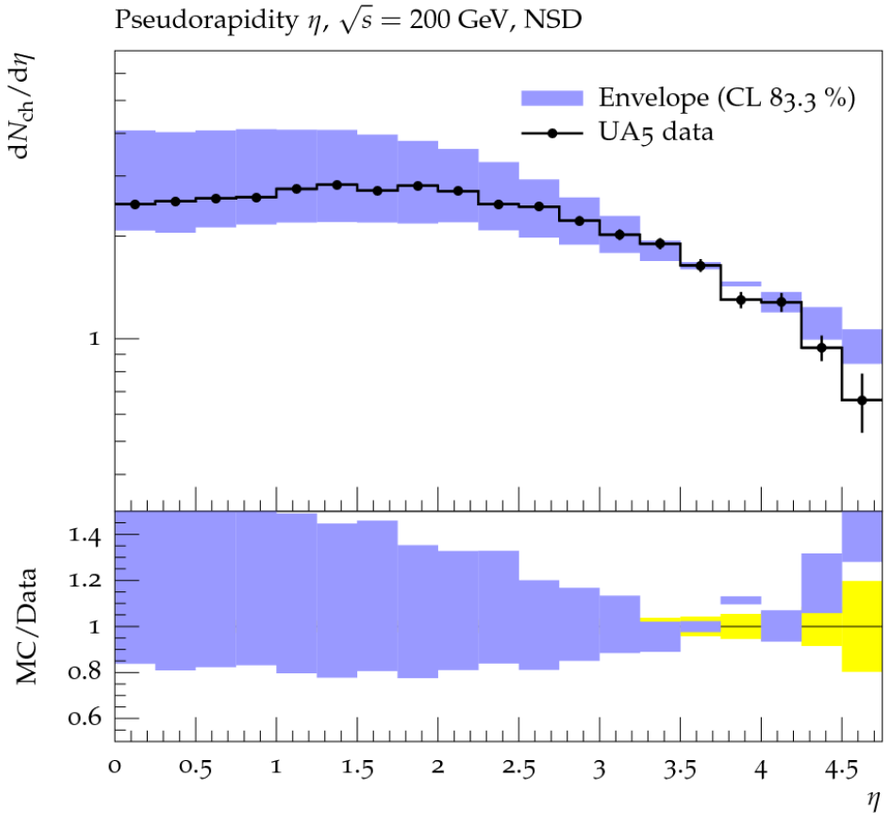

Pseudorapidity η, $\sqrt{s} = 200$ GeV, NSD
$dN_{ch}/d\eta$
UA5 data
MC (UA53476ECM200GE
MC/Data
η

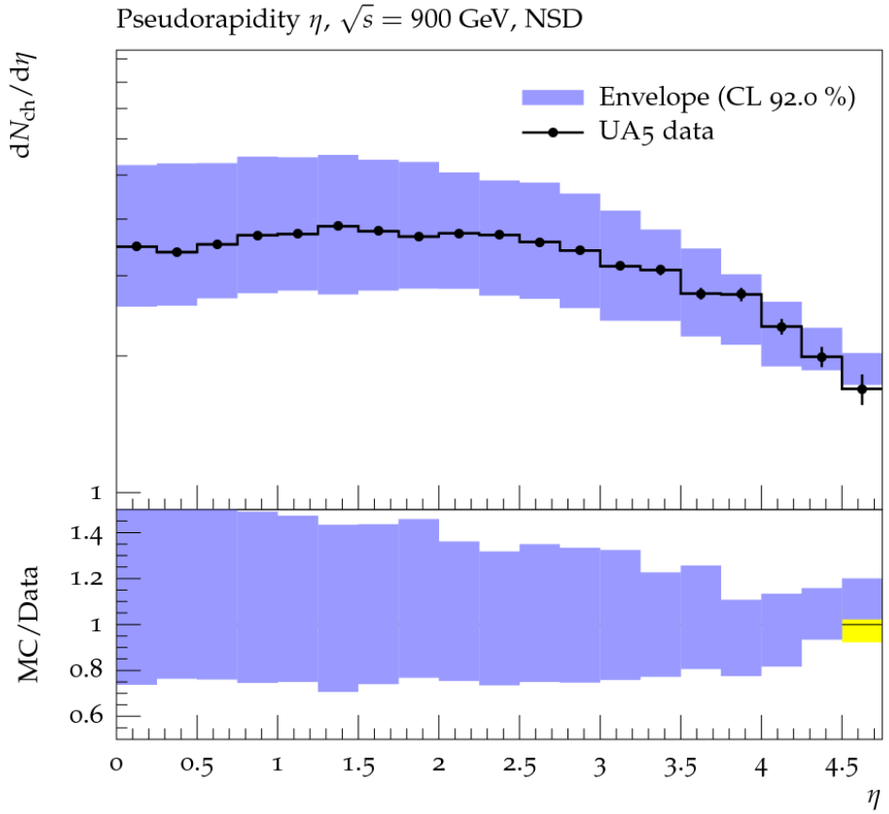

Pseudorapidity η, $\sqrt{s} = 900$ GeV, NSD
$dN_{ch}/d\eta$
UA5 data
MC (UA53476ECM900GE
MC/Data
η

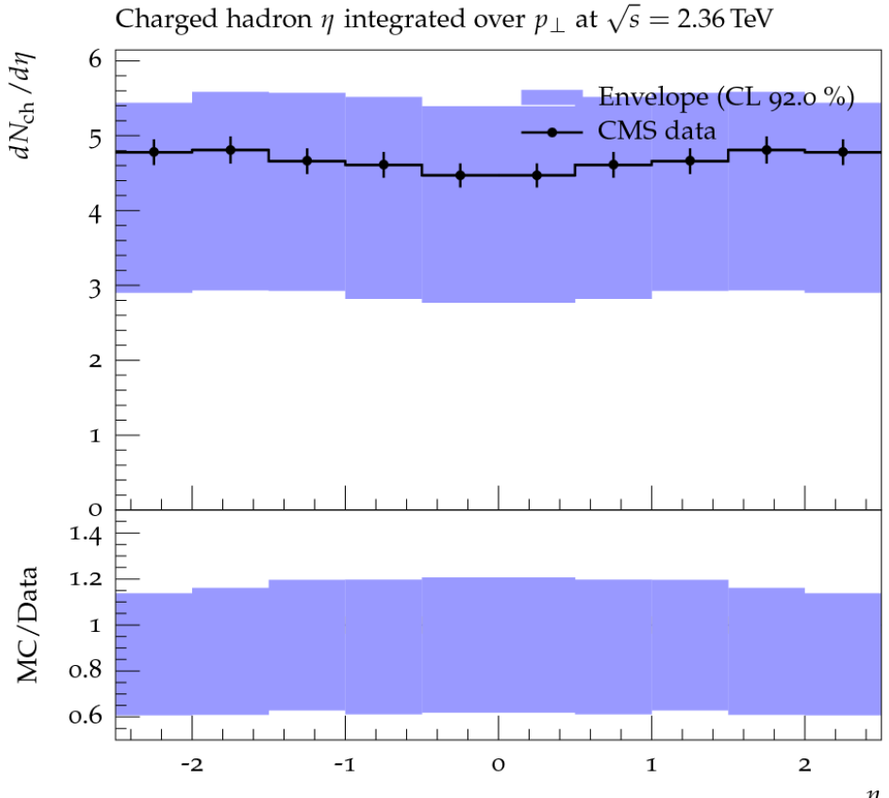
Charged hadron η integrated over $p_\perp$ at $\sqrt{s} = 2.36$ TeV
$dN_{ch}/d\eta$
CMS data
MC (CMS7297ECM2360G
MC/Data
η


Charged hadron η integrated over $p_\perp$ at $\sqrt{s} = 7$ TeV
$dN_{ch}/d\eta$
CMS data
MC (CMS6010ECM7TEV)
MC/Data
η

Envelopes


Pseudorapidity η, $\sqrt{s} = 200$ GeV, NSD
$dN_{ch}/d\eta$
Envelope (CL 83.3 %)
UA5 data
MC/Data
η


Pseudorapidity η, $\sqrt{s} = 900$ GeV, NSD
$dN_{ch}/d\eta$
Envelope (CL 92.0 %)
UA5 data
MC/Data
η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MC/Data
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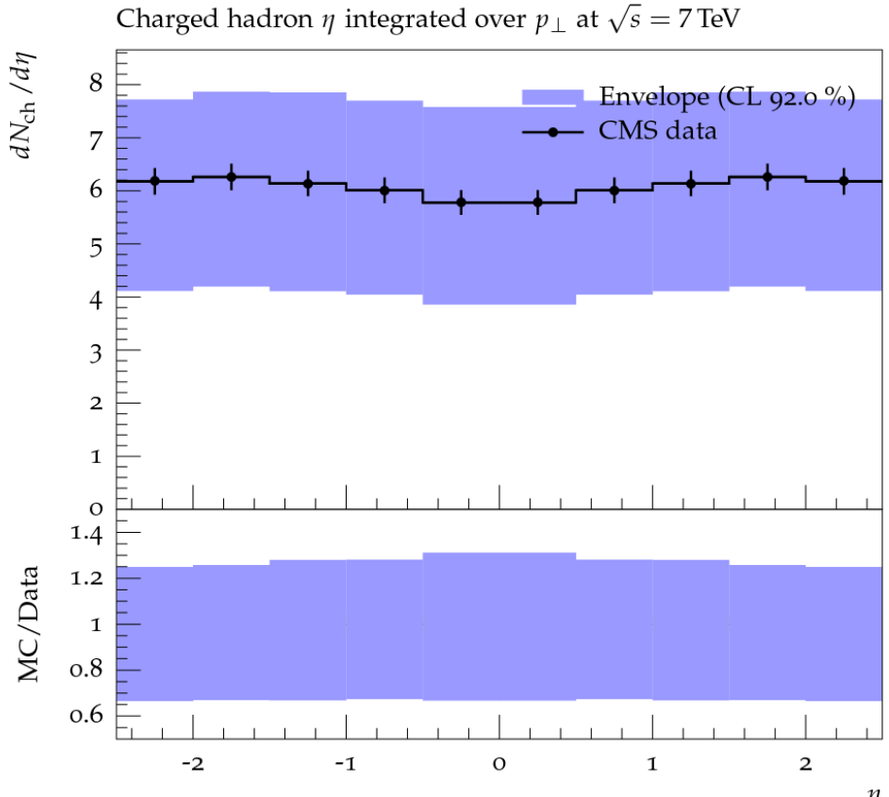
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$dN_{ch}/d\eta$
Envelope (CL 92.0 %)
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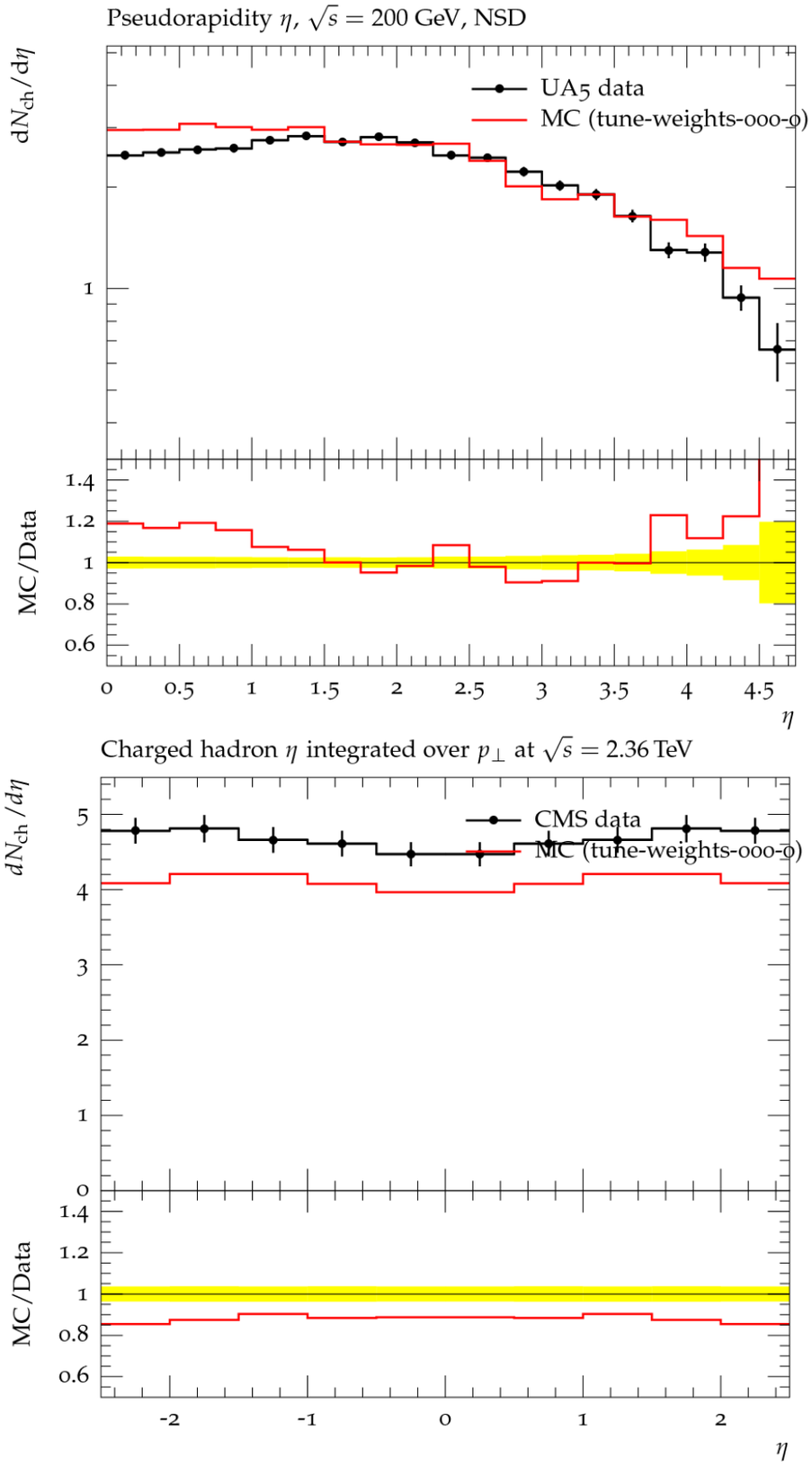
η

Professor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$dN_{ch}/d\eta$
UA5 data
MC (tune-weights-ooo-o)
MC/Data
η
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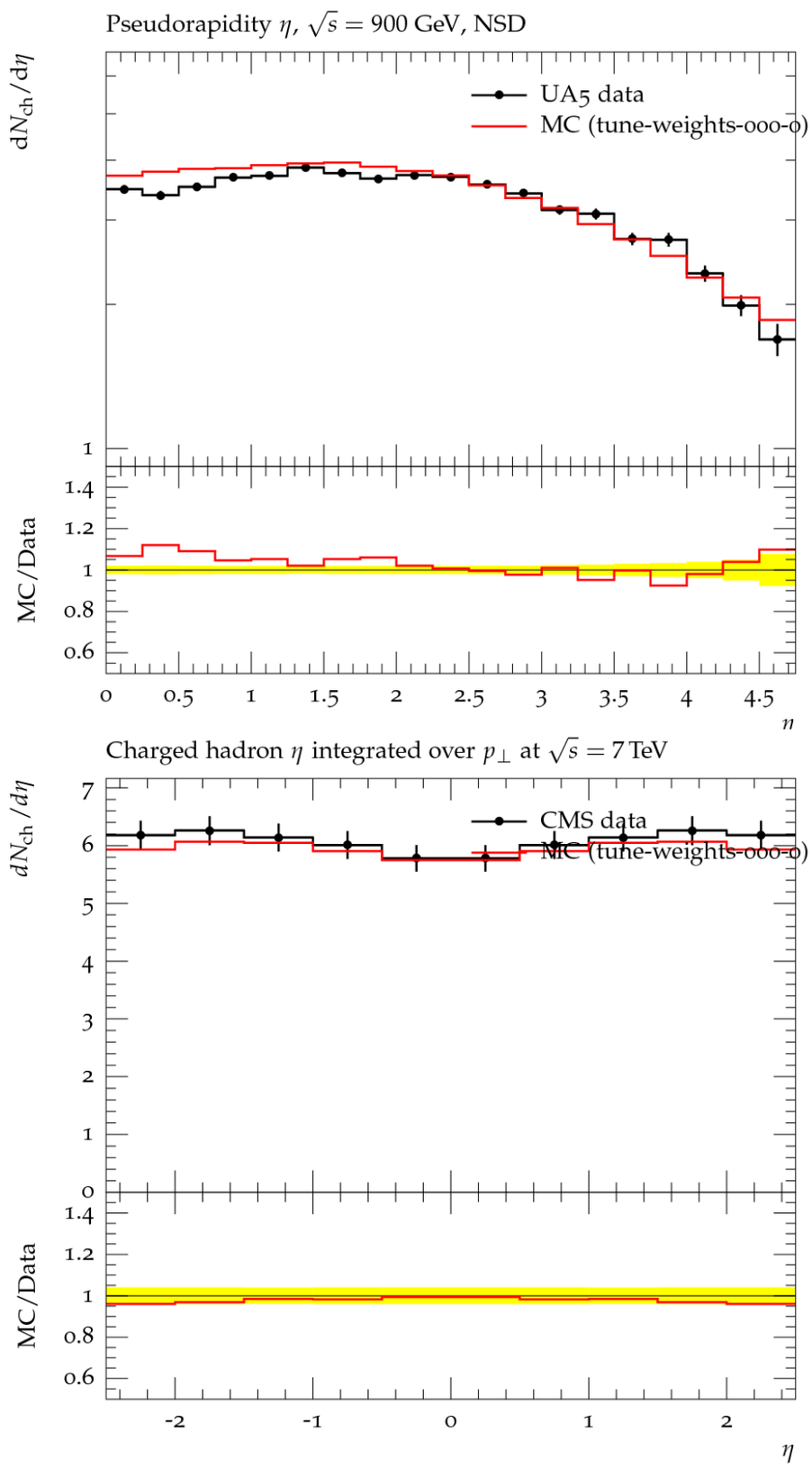
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$dN_{ch}/d\eta$
CMS data
MC (tune-weights-ooo-o)
MC/Data
η

Conclusions & Prospects

- ✓ Preliminary Results concerning Phase I's proposal
- ✓ Tuned to different √s
- ✓ Pythia6 Z2*LEP
- ✓ Param Value
  PARP(82) 1.58
  PARP(90) 0.18
- ✓ Twiki (progress and instructions)
  https://twiki.cern.ch/twiki/bin/viewauth/CMS/MinBiasMCTunning
- ✓ Pythia8
- ✓ Forward regions (η > |2.5| needs more attention)
- ✓ Different Kinematic regions : ATLAS, ALICE, TOTEM