

Forward Physics Working Group Organisation

Christophe Royon
IRFU-SPP, CEA Saclay
Nicolo Cartiglia
INFN, Torino

April 18 2013

Contents:

- Working groups
- Conveners
- Aims
- Meeting dates and places

Working groups and conveners

- **Motivation:** New working groups aim at producing a strong physics case to be used within each experiment and in front of LHCC.
- **Steering group with representants from all LHC experiments** Christophe Royon (co-chair) (ATLAS)' Nicolò Cartiglia (co-chair) (CMS), Martin Poghosyan (Alice), Gerardo Herrera (Alice), Oldrich Kepka (ATLAS), Michael Albrow (CMS), Michele Arneodo (CMS), Paula Collins (LHCb), Takashi Sako (LHCf), Alessia Tricomi (LHCf), Risto Orava (TOTEM), Joachim Baechler (TOTEM), Kenneth Oesterberg (TOTEM), Michelangelo Mangano (LPCC), David Berge (ATLAS, contact for cosmic rays issues)
- **Three different working groups:**
 - “Low” luminosity (up to a few 10 pb^{-1}); Lucian Harland Lang (theory), Valery Khoze (theory), Martin Poghosyan (Alice), Tim Martin (ATLAS), Antonio Vilela (CMS), Dima Volynskyy (LHCb), Takashi Sako (LHCf), Alessia Tricomi (LHCf), Valentina Avati (Totem)
 - “Medium” luminosity (up to a few 100 pb^{-1}); Cyrille Marquet (theory), Jochen Bartels (theory), Gerardo Herrera (Alice), Christophe Royon (ATLAS), Nicolò Cartiglia (CMS), Ronan McNulty (LHCb), Paula Collins (LHCb), Ken Osterberg (TOTEM)
 - “High” Luminosity (a few 100 fb^{-1}); Rikard Enberg (theory), Antoni Szczurek (theory), Jonathan Hollar (CMS), Risto Orava (TOTEM), Rafal Staszewski (Atlas)

Working groups and conveners

- For each working group, two “chairs” (one theorist and one experimentalist) who are responsible for the working coordination between the different conveners and preparation for the activities and workshops: we propose Lucian and Tim (low lumi), Jochen and Paula (medium lumi), Antoni and Jon (high lumi)
- WEB page with meetings, agendas, talks, documents: volunteer for web master (twiki...)?
- 2 day meetings organised every 5-6 weeks at CERN, and longer meetings outside CERN (see next slides for proposed dates); additional meetings separately for each working group possible when needed

Aim of the series of workshops: physics topics

- **Theory/Phenomenology:** new ideas of measurements, possibilities to see the evolution between 7, 8, 14 TeV center-of-mass energy
- **Key measurements to probe a given model:** less dependent on MC corrections, or theoretical corrections
- **What are the present limitations of existing analyses? How can it be improved using proton tagging or better coverage in the forward region? Example of anomalous coupling studies**
- **New measurements to be performed with proton tagging:** Pomeron structure
- **Issues with MC:** contamination from non-diffractive events? Extrapolation to unmeasured areas? MC tune: do we want to agree on a few tunes so that we can compare the results from different studies?
- **Technical aspects of the analysis:** Pile up treatment? Beam induced background? Description of energy flow in the forward region and effects on precision measurements?
- **Development of generators:** Hannes Jung, Peter Skands, Robert Ciesielski
- **Forward particle production and relationship with cosmic ray physics**

Aim of the series of workshops: technical topics

- Technical aspects important to be shared between the collaborations
 - Roman pots
 - Movable beam pipes (needed at 420 m)
 - Timing detectors: QUARTIC or similar, Diamonds, Sampic readout chip...
 - Technical sessions will happen towards the end of the workshop (more interesting for experimentalists than theorists even if they are welcome to join!)
- Backgrounds and pile up
- Outputs of the physics and technical studies:
 - Progress reports expected at each working group meeting (common meetings every 5-6 weeks) organised by the conveners
 - More important reviews and discussions foreseen for larger meetings outside CERN: Calabria in July (starting meeting where the aims/topics of studies should be defined); Cracow: mid-term meeting at the end of November; Trento (tbc): final meeting
 - CERN yellow report (target date: April 2014?) summarising different studies

Working Group Meetings

- 2 day meetings every 4-5 weeks (longer for meetings outside): half day for each working group, 1 half day for common sessions and summary of the 3 working group activities
- May 15-16: CERN
- July 15-18: Reggio de Calabria, Italy, please register at http://www-d0.fnal.gov/royon/diffraction_calabria
- August 26-27: CERN
- October 16-17: CERN
- November 18-19-20: Cracow
- January 14-15: CERN
- Last week of February - 1st week of March: CERN
- End of April?: Trento (tbc)
- Please let us know if these dates are not convenient (overlap with otehr meetings...)

Physics topics

- Anomalous couplings, electroweak sector: $\gamma\gamma WW$, $\gamma\gamma ZZ$, $\gamma\gamma\gamma\gamma$, HIGH LUMI
- Exclusive production (Higgs, jets...): HIGH LUMI and MEDIUM LUMI (low mass), probe KMR mechanism
- Pomeron structure (quark/gluon), hard DPE events (jets, W , Z): MEDIUM LUMI
- Hard single diffraction (W , Z jets...): LOW LUMI
- BFKL effects: Mueller Navelet jets, jet gap jets: MEDIUM LUMI
- Soft diffraction: LOW LUMI
- Monopoles? HIGH LUMI
- Heavy ions: proton tagging? Energy in forward region (Color glass condensate), MEDIUM LUMI
- Energy in forward region: underlying events, survival probability, link with cosmic rays... LOW LUMI
- Photon Pomeron: MEDIUM LUMI
- Experimental aspects: detectors (RP, HBP, timing...), background, pile up