



# Parton Distributions for the LHC

Benasque Center for Science *Pedro Pascual*

Introduction and Logistics

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Parton Distributions for the LHC, Benasque Center for Science, 16/02/2015

# Welcome to Benasque!

- 🗣️ First of all thank you all for coming to **Benasque** and to the *Pedro Pascual Center for Sciences*, I am sure we will have a great week here!
- 🗣️ Details about **access to the Center**, **Internet access** etc are available in the **folder** that you receive during registration
- 🗣️ The Center has **plenty of desks for work** (non assigned) as well as **several discussion spaces**. Talks will be held in the **main auditorium in the first floor**.
- 🗣️ You should find **other practical information** that you might need (activities, restaurants, transportation) in the same folder. Note that the Center has several interesting deals for instance with restaurants
- 🗣️ For those of you that have not paid the **registration fee** please do it asap and inform the Secretariat (unless the fee has been waived)
- 🗣️ In case you have any special needs, just let me and the Secretariat know!



# About the Workshop

- The goal of the **workshop** is to provide an **overview** of the field of **PDF determinations** at the dawn of the LHC Run II data taking, from the point of view of **experimental data, theoretical developments, tools for PDF fitting** and **methodological procedures**
- Talks will be **20+20 minutes**, thus allowing **ample time for discussions afterwards**
- The agenda has been kept deliberately light to allow for **free discussions and collaborative work** between the participants of the workshop
- Everyone knows about PDFs here, so please **skip the usual introduction/motivation slides** from your talk and let's go directly to the interesting material!
- In addition, we will have several **discussion sessions** during the workshop. **Everyone is encouraged to participate** in the discussion with 2/3 slides. The sessions will be
  - Theoretical uncertainties on PDFs (Wednesday, lead by Pavel)
  - Tools for PDF fits (Thursday)
  - PDF systematics in electroweak precision observables (Friday, lead by Stefano Camarda)
  - Recap of the workshop and plans for Run II (Friday)
- For the talks, using each own's laptop possible, but please **send me the .pdf of your talk** so that I can upload it on the agenda



# Ski and outdoor activities

- The workshop Secretariat has organised a free transfer service to the nearby **Cerler ski station**
- The bus would leave at **8.20 from Benasque** and then it will return at **13.00 from Cerler**
- For those interesting in taking this bus, please let the Secretariat know at your earliest convenience ([info@benasque.org](mailto:info@benasque.org))
- This service will be available **from Tuesday to Friday**, and is free for all the participants of the workshop
- The **ski pass for the four days in Cerler** should be around **110 euros per person**
- Many **other outdoor actives available**: hiking, climbing etc - Just ask the secretariat for more information



# Workshop Program

## Monday, February 16

### Morning session:

08:30h **Registration**

09:00h **Introduction to the workshop and logistics**

Juan Rojo

09:20h **CT plans**

Pavel Nadolsky

10:00h **MMHT plans**

Lucian Harland-Lang

10:40h **Coffee Break**

11:00h **NNPDF plans**

Juan Rojo

11:40h **HERAPDF plans**

Amanda Cooper-Sarkar

12:20h **Lunch break**

**Afternoon: free discussions / outdoor activities**

20:30h **Wine tasting + informal dinner**

Monday morning: **Updates and plans from PDF fitting collaborations**

Alberto Accardi's talk on **CJ PDFs and JLAB data** moved to Tuesday due to delayed flight

Afternoon: discussions / outdoor activities

Social event: **Wine tasting and informal dinner** at 20.0

# Workshop Program

## Tuesday, February 17

**Morning: free discussions / outdoor activities**

**Afternoon session: "Constraints from the LHC Run I and Run II"**

14:30h **Overview of PDF-sensitive measurements from Run I in ATLAS**

Susan Cheatham

15:10h **Overview of PDF-sensitive measurements from Run I in CMS**

Maxime Gouzevitch

16:00h **Overview of PDF-sensitive measurements from Run I in LHCb and plans for Run II**

Stephen Farry

16:40h **Coffee Break**

17:00h **Plans for PDF measurements at Run II and role of PDFs in MC tuning in ATLAS**

Voica Radescu

17:40h **Plans for PDF measurements at Run II in CMS**

Maxime Gouzevitch

18:10h **Pinning down the gluon from small- to large-x with LHCb data**

Rhorry Gauld

18:40h **CJ plans and future data from JLAB**

Alberto Accardi

19:20h **End of session**

Tuesday morning: discussions / outdoor activities

Tuesday afternoon: **Constraints on PDFs from LHC data**

Overview of PDF-sensitive measurements from Run I and plans for Run II



# Workshop Program

## Wednesday, February 18

**Morning: free discussions / outdoor activities**

11:00h **PDF4LHC discussion**

tbd (remote connection available)

**Afternoon session: Theoretical developments**

14:30h **Jets at NNLO: status and use in PDF fits**

Joao Pires

15:10h **High energy and threshold resummation in PDFs**

Marco Bonvini

16:00h **QED and EW corrections to LHC cross-sections: impact on PDFs**

Davide Pagani

16:40h **Coffee Break**

17:00h **Heavy quarks and Variable-Flavor number schemes in PDFs**

Maria Ubiali

17:40h **Non-perturbative charm and PDF fits**

Marco Bonvini

18:00h **Discussion session: theoretical uncertainties on PDFs**

all

19:00h **End of session**

Wednesday morning: discussions / outdoor activities

For those interested: at 11am **PDF4LHC discussion on updated benchmarks and recommendations.** Remote connection will be available.

Wednesday afternoon: **Theoretical developments relevant for PDF fits**

Common discussion on **theoretical uncertainties on PDFs**, lead by Pavel

# Workshop Program

## Thursday, February 19

**Morning: free discussions / outdoor activities**

**Afternoon session: Tools**

14:30h **LHAPDF6 developments and plans**

Andy Buckley

15:10h **APPLgrid developments and plans**

Mark Sutton

16:00h **FastNLO development and plans**

Klaus Rabbertz

16:40h **Coffee Break**

17:00h **HERAfitter status and plans**

Hayk Pirumov

17:40h **aMCfast developments and plans**

Valerio Bertone

18:20h **Discussion: desiderata on tools for PDF fits**

all

19:00h **End of session**

20:30h **Social dinner**

Thursday morning: discussions /  
outdoor activities

Wednesday afternoon: **Tools for PDF  
fits and their delivery**

Common discussion on **needs on tools  
for PDF fits**

At 20.30 we will have the workshop's  
**Social Dinner**



# Workshop Program

Friday morning: discussions / outdoor activities

Friday afternoon: **LHC phenomenology, benchmarking and recap**

Discussion on **PDF systematics for EWK precision observables**, lead by Stefano Camarda

Common discussion on **PDFs at the LHC Run II and PDF4LHC document**

## **Friday, February 20**

**Morning: free discussions / outdoor activities**

**Afternoon session: LHC phenomenology, Benchmarking and Recap**

**14:30h PDF uncertainties in precision electroweak measurements, including the W mass, in ATLAS**

Amanda Cooper-Sarkar

**15:10h PDFs and tuning event generators in CMS**

Samantha Dooling

**16:00h Discussion on PDF systematics for EWK precision observables**

all

**16:40h Coffee Break**

**17:00h Meta PDFs**

Pavel Nadolsky

**17:40h CMC-PDFs**

Stefano Carrazza

**18:20h Discussion: Recap on PDFs at the Run II of the LHC**

all

**19:00h End of session**

# Pedro Pascual (1934-2006)



**Prof Pedro Pascual** played a crucial role in the development of **Spanish particle physics**

He was the **first scientist to bring theoretical high-energy physics to Spain in the early 1960s** from his period of learning with **Yoichiro Nambu in Chicago**

He educated the **first highly competitive generation of theoretical particle physicists** and **led the development of experimental high-energy-physics groups across Spain**

Prof Pascual established the present Spanish system for evaluating researchers by quality of their work

He also **founded the Benasque Center for Science**, which will now carries his name