

**ESIPAP 2015 - Module 1 -  
Physics of particle and  
astroparticle detectors**

**Report of Contributions**

Contribution ID: 0

Type: **not specified**

## **A few things about particle accelerators**

Contribution ID: 1

Type: **not specified**

## Introduction

Contribution ID: 2

Type: **not specified**

## **Units, quantities, kinematics, measurements**

Contribution ID: 3

Type: **not specified**

## **Tutorial 1: kinematics, particle interaction and detector response**

Contribution ID: 4

Type: **not specified**

## **Particle interactions in particle detectors**

Contribution ID: 5

Type: **not specified**

## **Tutorial 2; analysis of classic experiments**

Contribution ID: 6

Type: **not specified**

## **Systems used to identify and measure particle properties**



Contribution ID: 7

Type: **not specified**

## **Tutorial 3: analysis of the ATLAS and CMS Higgs mass measurement papers**

Contribution ID: 8

Type: **not specified**

## Particle experiment design

Contribution ID: 9

Type: **not specified**

## **Tutorial 4: analysis of neutrino experiments**

Contribution ID: **10**

Type: **not specified**

## **Detection of neutrinos (and other invisible particles)**

Contribution ID: 11

Type: **not specified**

## **Full lecture notes, tutorial on CMB experiments, tutorial on LSS experiments**

**Presenter:** MACIAS-PEREZ, Juan Francisco (L)

Contribution ID: 12

Type: **not specified**

## **Experimental astoparticle physics : lecture 2**

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 13

Type: **not specified**

## **Experimental astroparticle physics : lecture 1**

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 14

Type: **not specified**

## **Experimental astroparticle physics : tutorial**

*Monday 2 February 2015 13:30 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)



Contribution ID: 15

Type: **not specified**

## **Experimental Astroparticle Physics (tutorial)**

*Tuesday 3 February 2015 08:45 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 16

Type: **not specified**

# Tutorial 1

**Presenter:** COLLOT, Johann (Centre National de la Recherche Scientifique (FR))

Contribution ID: 17

Type: **not specified**

## Lecture 1

**Presenter:** COLLOT, Johann (Centre National de la Recherche Scientifique (FR))

Contribution ID: **18**

Type: **not specified**

## **Tutorial 2**

**Presenter:** COLLOT, Johann (Centre National de la Recherche Scientifique (FR))

Contribution ID: 19

Type: **not specified**

## Lecture 2

**Presenter:** COLLOT, Johann (Centre National de la Recherche Scientifique (FR))

Contribution ID: **20**

Type: **not specified**

## Lecture 2

Statistic and estimators (mean, variance, maximum likelihood, chi-square fit)

**Presenter:** CLEMENT, Benoit Eric (Université Joseph Fourier/LPSC)

Contribution ID: 21

Type: **not specified**

## Lecture 1

Basics in probability theory

**Presenter:** CLEMENT, Benoit Eric (Université Joseph Fourier/LPSC)

Contribution ID: 22

Type: **not specified**

## Lecture 2

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))



Contribution ID: 23

Type: **not specified**

## Lecture 1

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 24

Type: **not specified**

## Lecture 4

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 25

Type: **not specified**

## Lecture 3

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 26

Type: **not specified**

## Exam material

Contribution ID: 27

Type: **not specified**

## Interaction of particles with matter

*Friday 30 January 2015 08:45 (1h 30m)*

**Presenter:** DI CIACCIO, Lucia (Centre National de la Recherche Scientifique (FR))

Contribution ID: 28

Type: **not specified**

# **Inaugural Lecture by Peter Jenni (Albert-Ludwigs-University-Freiburg-CERN) The long journey to the Higgs boson & beyond at the LHC**

*Monday 26 January 2015 10:30 (1h 30m)*

**Presenter:** JENNI, Peter (Albert-Ludwigs-Universitaet Freiburg (DE))

Contribution ID: 29

Type: **not specified**

## Experimental Cosmology

*Tuesday 27 January 2015 10:30 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)

Contribution ID: **30**

Type: **not specified**

## Welcome & School Presentation

*Monday 26 January 2015 08:45 (1h 30m)*



Contribution ID: **31**

Type: **not specified**

## **Experimental Subatomic Physics**

*Monday 26 January 2015 13:30 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: **32**

Type: **not specified**

## **Experimental Subatomic Physics**

*Monday 26 January 2015 15:15 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 33

Type: **not specified**

## Experimental Subatomic Physics

*Tuesday 27 January 2015 08:45 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 34

Type: **not specified**

## **Experimental Subatomic Physics (tutorial)**

*Tuesday 27 January 2015 13:30 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 35

Type: **not specified**

## Experimental Cosmology

*Tuesday 27 January 2015 15:15 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)

Contribution ID: 36

Type: **not specified**

## **Experimental Cosmology (tutorial)**

*Wednesday 28 January 2015 15:15 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)

Contribution ID: 37

Type: **not specified**

## Experimental Subatomic Physics

*Wednesday 28 January 2015 08:45 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: **38**

Type: **not specified**

## **Experimental Cosmology**

*Wednesday 28 January 2015 10:30 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)



Contribution ID: 39

Type: **not specified**

## **Experimental Subatomic Physics (tutorial)**

*Wednesday 28 January 2015 13:30 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 40

Type: **not specified**

## Experimental Subatomic Physics

*Thursday 29 January 2015 08:45 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 41

Type: **not specified**

## **Experimental Cosmology (tutorial)**

*Thursday 29 January 2015 10:30 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)

Contribution ID: 42

Type: **not specified**

## **Experimental Subatomic Physics (tutorial)**

*Thursday 29 January 2015 13:30 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 43

Type: **not specified**

## **Experimental Cosmology (tutorial)**

*Thursday 29 January 2015 15:15 (1h 30m)*

**Presenter:** MACIAS-PEREZ, Juan Francisco (LPSC, CNRS)

Contribution ID: 44

Type: **not specified**

## Experimental Astroparticle Physics

*Friday 30 January 2015 10:30 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 45

Type: **not specified**

## **Interaction of Particles with matter (tutorial)**

*Friday 30 January 2015 13:30 (1h 30m)*

**Presenter:** DI CIACCIO, Lucia (Centre National de la Recherche Scientifique (FR))

Contribution ID: 46

Type: **not specified**

## Experimental Astroparticle Physics

*Friday 30 January 2015 15:15 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)



Contribution ID: 47

Type: **not specified**

## Experimental Astroparticle Physics

*Monday 2 February 2015 08:45 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 48

Type: **not specified**

## **Stochastic & Statistical Aspects : A reminder on probability and statistics**

*Monday 2 February 2015 10:30 (1h 30m)*

**Presenters:** CLEMENT, Benoit (CERN); GUIGUE, Mathieu (LPSC)

Contribution ID: 49

Type: **not specified**

## **Stochastic & Statistical Aspects : A reminder on probability and statistics**

*Monday 2 February 2015 15:15 (1h 30m)*

**Presenters:** CLEMENT, Benoit (CERN); GUIGUE, Mathieu (LPSC)

Contribution ID: 50

Type: **not specified**

## **Experimental Subatomic Physics (tutorial)**

*Tuesday 3 February 2015 10:30 (1h 30m)*

**Presenter:** DELMASTRO, Marco (CNRS/IN2P3 LAPP)

Contribution ID: 51

Type: **not specified**

## **C++ Programming**

*Tuesday 3 February 2015 13:30 (1h 30m)*

**Presenter:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR))

Contribution ID: 52

Type: **not specified**

## **C++ Programming**

*Tuesday 3 February 2015 15:15 (1h 30m)*

**Presenter:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR))

Contribution ID: 53

Type: **not specified**

## **Radioprotection**

*Wednesday 4 February 2015 08:45 (1h 30m)*

**Presenter:** Dr VINCKE, Helmut (CERN)

Contribution ID: 54

Type: **not specified**

## **Radioprotection**

*Wednesday 4 February 2015 10:30 (1h 30m)*

**Presenter:** Dr VINCKE, Helmut (CERN)



Contribution ID: 55

Type: **not specified**

## **C++ Programming**

*Wednesday 4 February 2015 13:30 (1h 30m)*

**Presenter:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR))

Contribution ID: 56

Type: **not specified**

## **C++ Programming**

*Wednesday 4 February 2015 15:15 (1h 30m)*

**Presenter:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR))

Contribution ID: 57

Type: **not specified**

## **Lab. Session : at CERN**

*Thursday 5 February 2015 08:45 (1h 30m)*

Contribution ID: 58

Type: **not specified**

## **Lab. Session : at CERN**

*Thursday 5 February 2015 10:30 (1h 30m)*

Contribution ID: 59

Type: **not specified**

## **Lab. Session : at CERN**

*Thursday 5 February 2015 13:30 (1h 30m)*

Contribution ID: **60**

Type: **not specified**

## **Lab. Session : at CERN**

*Thursday 5 February 2015 15:15 (1h 30m)*

Contribution ID: **61**

Type: **not specified**

## **Interaction of Particles with Matter**

*Friday 6 February 2015 08:45 (1h 30m)*

**Presenter:** DI CIACCIO, Lucia (Centre National de la Recherche Scientifique (FR))

Contribution ID: **62**

Type: **not specified**

## **Interaction of Particles with Matter (tutorial)**

*Friday 6 February 2015 10:30 (1h 30m)*

**Presenter:** DI CIACCIO, Lucia (Centre National de la Recherche Scientifique (FR))



Contribution ID: **63**

Type: **not specified**

## Tracking : Lecture 1

*Monday 9 February 2015 08:45 (1h 30m)*

**Presenters:** BESSON, Auguste Guillaume (Institut Pluridisciplinaire Hubert Curien (FR)); BAUDOT, Jerome (Institut de Recherches Subatomiques (IReS))

Contribution ID: **64**

Type: **not specified**

## Particle Identification

*Monday 9 February 2015 10:30 (1h 30m)*

**Presenter:** UNAL, Guillaume (CERN)

Contribution ID: 65

Type: **not specified**

## Particle Identification

*Monday 9 February 2015 13:30 (1h 30m)*

**Presenter:** UNAL, Guillaume (CERN)

Contribution ID: **66**

Type: **not specified**

## Tracking : Lecture 2

*Monday 9 February 2015 15:15 (1h 30m)*

**Presenters:** BESSON, Auguste Guillaume (Institut Pluridisciplinaire Hubert Curien (FR)); BAUDOT, Jerome (Institut de Recherches Subatomiques (IReS))

Contribution ID: 67

Type: **not specified**

## Tracking : Lecture 3

*Tuesday 10 February 2015 08:45 (1h 30m)*

**Presenters:** BESSON, Auguste Guillaume (Institut Pluridisciplinaire Hubert Curien (FR)); BAUDOT, Jerome (Institut de Recherches Subatomiques (IReS))

Contribution ID: 68

Type: **not specified**

## **Stochastic & Statistical Aspects : Multivariate analysis and boosted decision trees**

*Tuesday 10 February 2015 10:30 (1h 30m)*

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 69

Type: **not specified**

## **Stochastic & Statistical Aspects : Multivariate analysis and boosted decision trees**

*Tuesday 10 February 2015 13:30 (1h 30m)*

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 70

Type: **not specified**

## Tracking : tutorial

*Tuesday 10 February 2015 15:15 (1h 30m)*

**Presenters:** BESSON, Auguste Guillaume (Institut Pluridisciplinaire Hubert Curien (FR)); BAUDOT, Jerome (Institut de Recherches Subatomiques (IReS))



Contribution ID: 71

Type: **not specified**

## Calorimetry : lecture 1

*Wednesday 11 February 2015 08:45 (1h 30m)*

**Presenter:** WINGERTER, Isabelle (LAPP-CNRS)

Contribution ID: 72

Type: **not specified**

# Imaging and Cerenkov Detectors : Lecture 1

*Wednesday 11 February 2015 10:30 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 73

Type: **not specified**

## **Imaging and Cerenkov Detectors : Lecture 2**

*Wednesday 11 February 2015 13:30 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 74

Type: **not specified**

## **Imaging and Cerenkov Detectors : Lecture 3**

*Wednesday 11 February 2015 15:15 (1h 30m)*

**Presenter:** Prof. MONTANET, Francois (LPSC IN2P3/CNRS Univ. Grenoble)

Contribution ID: 75

Type: **not specified**

## **Lab. Session at CERN**

*Thursday 12 February 2015 08:45 (1h 30m)*

Contribution ID: 76

Type: **not specified**

## **Lab. Session at CERN**

*Thursday 12 February 2015 10:30 (1h 30m)*

Contribution ID: 77

Type: **not specified**

## **Lab. Session at CERN**

*Thursday 12 February 2015 13:30 (1h 30m)*

Contribution ID: 78

Type: **not specified**

## **Lab. Session at CERN**

*Thursday 12 February 2015 15:15 (1h 30m)*



Contribution ID: 79

Type: **not specified**

## Muon Detection

*Friday 13 February 2015 08:45 (1h 30m)*

**Presenter:** CHEVALIER, Laurent (CEA/IRFU,Centre d'étude de Saclay Gif-sur-Yvette (FR))

Contribution ID: **80**

Type: **not specified**

## **Muon Detection**

*Friday 13 February 2015 10:30 (1h 30m)*

**Presenter:** CHEVALIER, Laurent (CEA/IRFU,Centre d'étude de Saclay Gif-sur-Yvette (FR))

Contribution ID: **81**

Type: **not specified**

## **Muon Detection**

*Friday 13 February 2015 13:30 (1h 30m)*

**Presenter:** CHEVALIER, Laurent (CEA/IRFU,Centre d'étude de Saclay Gif-sur-Yvette (FR))

Contribution ID: **82**

Type: **not specified**

## Calorimetry

*Monday 16 February 2015 08:45 (1h 30m)*

**Presenter:** WINGERTER, Isabelle (LAPP-CNRS)

Contribution ID: **83**

Type: **not specified**

## **Detector Simulation**

*Monday 16 February 2015 10:30 (1h 30m)*

**Presenters:** Dr RIBON, Alberto (CERN); POKORSKI, Witold (CERN)

Contribution ID: **84**

Type: **not specified**

## Calorimetry

*Monday 16 February 2015 13:30 (1h 30m)*

**Presenter:** WINGERTER, Isabelle (LAPP-CNRS)

Contribution ID: **85**

Type: **not specified**

## **Detector Simulation**

*Monday 16 February 2015 15:15 (1h 30m)*

**Presenters:** Dr RIBON, Alberto (CERN); POKORSKI, Witold (CERN)

Contribution ID: **86**

Type: **not specified**

## **Muon Detection**

*Tuesday 17 February 2015 08:45 (1h 30m)*

**Presenter:** CHEVALIER, Laurent (CEA/IRFU,Centre d'étude de Saclay Gif-sur-Yvette (FR))



Contribution ID: **87**

Type: **not specified**

## **Detector Simulation**

*Tuesday 17 February 2015 10:30 (1h 30m)*

**Presenters:** Dr RIBON, Alberto (CERN); POKORSKI, Witold (CERN)

Contribution ID: **88**

Type: **not specified**

## Calorimetry

*Tuesday 17 February 2015 13:30 (1h 30m)*

**Presenter:** WINGERTER, Isabelle (LAPP-CNRS)

Contribution ID: **89**

Type: **not specified**

## **Detector Simulation**

*Tuesday 17 February 2015 15:15 (1h 30m)*

**Presenters:** Dr RIBON, Alberto (CERN); POKORSKI, Witold (CERN)

Contribution ID: **90**

Type: **not specified**

## Computing Sessions

*Wednesday 18 February 2015 08:45 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: **91**

Type: **not specified**

## Computing Sessions

*Wednesday 18 February 2015 10:30 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: 92

Type: **not specified**

## Computing Sessions

*Wednesday 18 February 2015 13:30 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: 93

Type: **not specified**

## Computing Sessions

*Wednesday 18 February 2015 15:15 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: 94

Type: **not specified**

## Computing Sessions

*Thursday 19 February 2015 08:45 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))



Contribution ID: 95

Type: **not specified**

## Computing Sessions

*Thursday 19 February 2015 10:30 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: **96**

Type: **not specified**

## Computing Sessions

*Thursday 19 February 2015 13:30 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: 97

Type: **not specified**

## Computing Sessions

*Thursday 19 February 2015 15:15 (1h 30m)*

**Presenters:** CHABERT, Eric (Institut Pluridisciplinaire Hubert Curien (FR)); CONTE, Eric (Laboratoire de Physique Corpusculaire (LPC))

Contribution ID: 98

Type: **not specified**

## **Stochastic & Statistical Aspects : Multivariate analysis and boosted decision trees**

*Friday 20 February 2015 08:45 (1h 30m)*

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: 99

Type: **not specified**

## **Stochastic & Statistical Aspects : Multivariate analysis and boosted decision trees**

*Friday 20 February 2015 10:30 (1h 30m)*

**Presenter:** COADOU, Yann (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Contribution ID: **100**

Type: **not specified**

## Exam Calorimetry

*Friday 20 February 2015 13:30 (1h 30m)*