

LFC17: Old and New Strong Interactions from LHC to Future Colliders

chaired by Gennaro Corcella, Marcel Vos, Stefania De Curtis, Stefano Moretti, Roberto Tenchini, Giulia Pancheri

from Monday, 11 September 2017 at **14:15** to Friday, 15 September 2017 at **14:00** (Europe/Rome)
at **ECT*, Villa Tambosi, Villazzano (Trento)**

Description Aim of the workshop:

The proposed workshop will highlight current problems posed by strong interactions in perturbative and non-perturbative regimes and discuss how future colliders beyond the LHC can shed light on them. In particular, our meeting will deal with the following issues: state of the art of perturbative and non-perturbative QCD, non-perturbative uncertainties and interpretation of the top-quark mass, strong interactions as the binding force of new fermions in composite Higgs models, role played by QCD in new physics searches at the LHC, hadronic contribution to the leptonic gyromagnetic moment.

The program will be organized with introductory talks on strong interactions at present and future colliders and the following topical working groups:

Perturbative QCD (Convener G. Ferrera)
Non-perturbative QCD and heavy ions (Convener A. Beraudo)
Top-quark physics (Convener F. Tramontano)
Leptonic $g-2$ (Convener C. Calame Carloni)
Higgs physics (Conveners A. Deandrea and R. Franceschini)
Exotics and Dark Matter (Conveners A. Urbano and O. Panella)

Contact:
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Organizers:
Gennaro Corcella (INFN LNF, chairman)
Stefania De Curtis (INFN Florence)
Stefano Moretti (University of Southampton)
Giulia Pancheri (INFN LNF)
Roberto Tenchini (INFN Pisa)
Marcel Vos (Universidad de Valencia)

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Monday, 11 September 2017

- 14:30 - 18:30 Introduction to strong interactions at present and future colliders (Chairs: M. Vos and R. Tenchini)
- 14:30 **Accelerators and experiments for the future energy frontier** 30'
Speaker: Brian Foster
- 15:00 **QCD measurements at the LHC** 30'
Speaker: Ulla Blumenschein
- 15:30 **Strong-interaction physics at future energy-frontier colliders** 30'
Speaker: Frank Simon
- 16:00 **Coffee Break** 30'
- 16:30 **The QCD challenge for precision at colliders** 30'
Speaker: Pier Francesco Monni
- 17:00 **Beyond the Standard Model with strong dynamics** 30'
Speaker: Roberto Contino
- 17:30 **State of the art and open issues in heavy-ion physics at present and future colliders** 30'
Speaker: Gunther Roland
- 18:00 **Discussion** 30'

Tuesday, 12 September 2017

- 09:30 - 14:30 Perturbative QCD (Chair: G. Ferrera)
- 09:30 **Highlights on high p_T measurements at the LHC** 30'
Speaker: Andrea Rizzi
- 10:00 **Jets cross sections in NNLO QCD in lepton and hadron collisions** 30'
Speaker: Gabor Somogyi
- 10:30 **Coffee Break** 30'
- 11:00 **New techniques for higher-order calculations in lepton and hadron collisions** 30'
Speaker: German Sborlini
- 11:30 **Azimuthal asymmetries in QCD hard scattering: IR safe but divergent** 30'
Speaker: Massimiliano Grazzini
- 12:00 **Discussion** 30'
- 12:30 - 14:30 Lunch Break

- 14:30 - 18:30 Non-perturbative QCD and heavy ions (Chairs: A. Beraudo and S. Moretti)
- 14:30 **A democratic resummation procedure for infrared gluons: an application to survival probabilities** 30'
Speaker: Giulia Pancheri
- 15:00 **Nuclear parton distribution functions** 30'
Speaker: Petja Paakkinen
- 15:30 **Initial state and gluon saturation** 30'
Speaker: Guillaume Beuf
- 16:00 **Coffee Break** 30'
- 16:30 **Hydrodynamics** 30'
Speaker: Piotr Bozek
- 17:00 **Jet quenching and fluid dynamics** 30'
Speaker: Urs Wiedemann
- 17:30 **Heavy flavours in high-energy nuclear collisions: overview of transport calculations** 30'
Speaker: Andrea Beraudo
- 18:00 **Discussion** 30'

Wednesday, 13 September 2017

- 09:30 - 13:00 Top-quark phenomenology (Chair: F. Tramontano)
- 09:30 **Overview of top phenomenology** 30'
Speaker: Alberto Orso Maria Iorio
- 10:00 **Top-quark pair production with resonance-aware methods** 30'
Speaker: Paolo Nason
- 10:30 **Top-quark mass determination** 30'
Speaker: Peter Uwer
- 11:00 **Coffee Break** 30'
- 11:30 **NNLO $t\bar{t}$ production at hadron colliders** 30'
Speaker: Roberto Bonciani
- 12:00 **Top physics at future hadron and lepton colliders** 30'
Speaker: Marcel Vos
- 12:30 **Discussion** 30'
- 13:00 - 14:00 Lunch Break
- 14:00 - 19:00 Excursion to Lake Tovel, with an introduction to the lake by Dr. Giovanna Flaim (Edmund Mach Foundation)

Thursday, 14 September 2017

- 09:30 - 12:00 g-2 (Chair: C.M. Carloni Calame)
- 09:30 **Past and future muon g-2 experiments** 30'
Speaker: Anna Driutti
- 10:00 **Theory status and prospects for muon g-2 evaluations** 30'
Speaker: Massimo Passera
- 10:30 **The hadronic vacuum polarisation contribution to the muon g-2** 30'
Speaker: Alex Keshavarzi
- 11:00 **Discussion** 30'
- 11:30 **Coffee Break** 30'
- 12:00 - 16:30 BSM and Higgs physics (Chair: A. Deandrea)
- 12:00 **Measuring quark polarizations at ATLAS and CMS** 30'
Speaker: Yevgeny Kats
- 12:30 **Lattice field theory results on new strong dynamics** 30'
Speaker: Enrico Rinaldi
- 13:00 **Lunch Break** 1h30'
- 14:30 **Composite Higgs and Dark Matter** 30'
Speaker: Giacomo Cacciapaglia
- 15:00 **Strong dynamics and the hierarchy problem** 30'
Speaker: Alex Pomarol
- 15:30 **Strong dynamics beyond the hierarchy problem** 30'
Speaker: Michele Redi

- 16:00 **Coffee Break** 30'
- 16:30 - 18:00 BSM and Exotics (Chair: A.L. Urbano)
- 16:30 **Exotic quarks of charge 5/3 from composite models** 30'
Speaker: Roberto Leonardi
- 17:00 **Dark matter searches at the LHC in the context of strongly coupled theories** 30'
Speaker: Daniele Barducci
- 17:30 **Discussion** 30'

Friday, 15 September 2017

- 09:30 - 13:00 BSM and Dark Matter (Chairs: O. Panella and R. Franceschini)
- 09:30 **Experimental review on top-partner searches** 30'
Speaker: Meenakshi Narain
- 10:00 **Vector-like top-quark partners** 30'
Speaker: Elisabetta Furlan
- 10:30 **B-decay anomalies and dark matter from strong dynamics** 30'
Speaker: James Cline
- 11:00 **Coffee Break** 30'
- 11:30 **Visibility of the Higgs Mode In Condensed Matter** 30'
Speaker: Assa Auerbach
- 12:00 **Strongly Interacting Light Dark Matter** 30'
Speaker: Alfredo Leonardo Urbano
- 12:30 **Discussion** 30'
- 13:00 - 14:00 Lunch