

LIO international conference on Composite Models, Electroweak Physics and the LHC

Rapport sur les contributions

ID de Contribution: 43

Type: **Non spécifié**

Composite Higgs and Yukawa coupling in walking gauge theories

lundi 5 septembre 2016 09:15 (45 minutes)

Composite models are still attractive as new physics scenarios. For example, once some excesses are reported by experiments, many authors propose composite models matched with data. In the SM, Yukawa couplings are mysterious. I discuss the Yukawa coupling in walking gauge theories.

Orateur: Prof. HASHIMOTO, Michio**Classification de Session:** Composite Dynamics

ID de Contribution: 44

Type: **Non spécifié**

Non-perturbative analysis of the spectrum of meson resonances in an ultraviolet-complete composite-Higgs model

lundi 5 septembre 2016 10:30 (1 heure)

Orateur: Dr FRIGERIO, Michele

Classification de Session: Composite Dynamics

ID de Contribution: 45

Type: **Non spécifié**

Observation of a Higgs boson at 125 GeV and search for an additional low-mass Higgs boson in the diphoton channel in CMS

lundi 5 septembre 2016 14:45 (30 minutes)

An observation of the Higgs boson production for the two photon decay channel with the 2016 LHC Run 2 data is described. The analysis is performed using the dataset recorded by the CMS experiment at the LHC from pp collisions at centre-of-mass energy of 13 TeV corresponding to an integrated luminosity of 12.9 fb⁻¹. The observed significance at the Run 1 ATLAS+CMS combined $m_H = 125.09$ GeV is 5.6 sigma, where 6.2 sigma is expected. The best-fit signal strength relative to the standard model prediction is 0.95 ± 0.20 .

Also, a search for an additional light Higgs boson decaying into two photons, in the mass range 80-110 GeV, is reported. This search is performed using a dataset of 19.7 fb⁻¹ recorded by CMS at a center of mass energy of 8 TeV. No evidence for new particle is observed.

Orateur: M. COURBON, Benoit

Classification de Session: Higgs physics and results

ID de Contribution: 46

Type: **Non spécifié**

Higgs boson from a soft wall geometry

lundi 5 septembre 2016 14:00 (45 minutes)

Many different extensions of the Standard Model have been proposed where the Higgs doublet is emerging as a bound state from a new physics strongly coupled sector: I discuss a general class of these models, recently reviewed in 1511.08218, where the new sector is an approximate conformal theory and the Higgs scalar experiences non trivial spectral properties, as a Higgs continuum, besides the 125 GeV pole. A novel realization of these models is then proposed in terms of a dual description based on a warped five dimensional theory with a soft wall geometry and some properties of this scenario are derived.

Orateur: Dr PAROLINI, Alberto**Classification de Session:** Higgs physics and results

ID de Contribution: 47

Type: **Non spécifié**

Search for a lighter Higgs in Two Higgs Doublet Model

lundi 5 septembre 2016 15:15 (30 minutes)

Abstract : We study the two higgs doublet model with the mass of the heavy higgs set to 125GeV. We study the lighter Higgs of the model , constrain the different free parameters and see if we are sensitive at LHC at 8TeV in the $h \rightarrow \gamma \gamma$ channel.

Orateur: Mme LE CORRE, Solène

Classification de Session: Higgs physics and results

ID de Contribution: 48

Type: **Non spécifié**

Higgs particle signal at the LHC from the gauged Unparticles Model

lundi 5 septembre 2016 16:30 (45 minutes)

Abstract: The effect of scalar and spinor gauged unparticles on the decay rates $H \rightarrow \gamma + \gamma$ and $h \rightarrow Z + \gamma$ are considered. The theoretical results of the model are also discussed on the light of the latest data of the LHC experiments.

Orateur: Prof. MEBARKI, Nouredine

Classification de Session: Higgs physics and results

ID de Contribution: 49

Type: **Non spécifié**

Higgs boson from a soft wall geometry

Many different extensions of the Standard Model have been proposed where the Higgs doublet is emerging as a bound state from a new physics strongly coupled sector: I discuss a general class of these models, recently reviewed in 1511.08218, where the new sector is an approximate conformal theory and the Higgs scalar experiences non trivial spectral properties, as a Higgs continuum, besides the 125 GeV pole. A novel realization of these models is then proposed in terms of a dual description based on a warped five dimensional theory with a soft wall geometry and some properties of this scenario are derived.

Orateur: Dr PAROLINI, Alberto

ID de Contribution: 50

Type: **Non spécifié**

Asymptotic Safety Beyond the Standard Model

lundi 5 septembre 2016 11:30 (1 heure)

Orateur: Dr KOWALSKA, Kamila

Classification de Session: Composite Dynamics

ID de Contribution: 51

Type: **Non spécifié**

Hunting Composite Higgs model UV completions in di-boson and $t\bar{t}$ searches at the LHC

mardi 6 septembre 2016 09:00 (1 heure)

Abstract: Models of compositeness can successfully address the origin of the Higgs boson, as a pseudo-Goldstone of a spontaneously broken global symmetry, and flavour physics via the partial compositeness mechanism. If the dynamics is generated by a simple underlying theory defined in terms of a confining gauge group with fermionic matter content, there exists only a finite set of models that have the correct properties to account for the Higgs and top partners at the same time. As a prediction, one obtains additional light scalars. We study the phenomenology of these additional scalars in light of the di-boson and $t\bar{t}$ searches at LHC. based on: PRD94 (2016) no.1, 015004, and work in progress in collaboration with A. Belyaev, G. Cacciapaglia, H. Cai, G. Ferretti, A. Parolini, H. Serodio

Orateur: Dr THOMAS, Flacke**Classification de Session:** Composite dynamics

ID de Contribution: 52

Type: **Non spécifié**

(Accurate) Predictions for New Strong Dynamics at the LHC and Future Colliders

mardi 6 septembre 2016 10:30 (45 minutes)

I will shortly discuss some “peculiar” aspects of the phenomenology of composite dynamics at the LHC and future colliders. First, I will show the implication of eta-like resonance decaying into top-quark pair in shedding light on the mechanism to generate SM-fermion masses, the importance of interference and QCD corrections in this search and a analysis of the limits and projections. Second, the eventual presence of near-degenerate composite vector resonances and their signals. Finally, I will discuss the dynamical generation of a broad scalar resonances, its importance in unitarizing weak boson scattering and a prescription to describe its line shape in a gauge invariant fashion.

Orateur: Dr BUARQUE FRANZOSI, Diogo**Classification de Session:** Composite dynamics

ID de Contribution: 53

Type: **Non spécifié**

Flavoured opportunities from strong dynamics

mardi 6 septembre 2016 11:15 (45 minutes)

Orateur: Dr NARDECCHIA, Marco

Classification de Session: Composite dynamics

ID de Contribution: 54

Type: **Non spécifié**

Recent ATLAS results in the search for composite dynamics and Dark Matter

mardi 6 septembre 2016 14:00 (1 heure)

Orateur: Prof. JACKSON, Paul (ATLAS)

Classification de Session: Review of Experimental Results

ID de Contribution: 55

Type: **Non spécifié**

Recent CMS Results on Composite Models and Dark Matter

mardi 6 septembre 2016 15:00 (1 heure)

Orateur: Dr OSHERSON, Marc Antoine (CMS)

Classification de Session: Review of Experimental Results

ID de Contribution: 56

Type: **Non spécifié**

Using Integral and Differential Charge Asymmetries for BSM Searches at the LHC

mardi 6 septembre 2016 16:30 (45 minutes)

Contrarily to past high energy colliders, the LHC is a charge asymmetric machine. Therefore most of the hard scattering processes producing electrically charged final states have a positive integral charge asymmetry. The latter quantity, denoted AC, is easily measurable in event topologies bearing an odd number of hard and isolated charged leptons. We have brought to light the strong correlation between AC and the mass of the charged final state. This enabled us to setup a new method of indirect mass measurement [1]. For example, this method enables to measure the mass of the W boson with a 1% accuracy. Obviously this is not competitive with respect to the standard technique based on the W transverse mass. However for other processes where more final state particles escape detection, we've demonstrated the integral charge asymmetry method to be much more effective. We illustrate this in a search for a supersymmetric production of chargino-neutralino pairs decaying in the trilepton inclusive topology. Nevertheless, in order to apply the integral charge asymmetry method, one needs to have a significant excess of signal events over the event yield of the corresponding background processes. We are currently extending this indirect mass measurement method using differential charge asymmetries. In addition to their sensitivity to the mass, the shape of these observables can also be exploited to improve the separation between a signal and its background processes. Our main physics case under study is the production of an heavy W' boson which decays into a single charged lepton. [1] S. Muanza and T. Serre, "A New Method for Indirect Mass Measurements using the Integral Charge Asymmetry at the LHC", JHEP 1604 (2016) 179, arXiv:1412.6695 [hep-ph].

Orateur: Prof. MUANZA, Steve**Classification de Session:** Review of Experimental Results

ID de Contribution: 57

Type: **Non spécifié**

Review of New Phenomena Searches in the Top Quark Sector with the ATLAS detector

mardi 6 septembre 2016 17:15 (45 minutes)

In this review, I propose to describe the most recent ATLAS results on search for Beyond the Standard Model (BSM) phenomena in the top quark sector. After quickly reminding why such BSM physics might appear in this sector, I will discuss in more details how the Standard Model can be extended (extra-dimension, compositeness, additional symmetry, etc ...), together with their associated experimental signatures. I will then show the various resonant searches performed in ATLAS as well as many non-resonant searches involving for e.g. vector-like quarks or the production of four top quarks. Experimental techniques such as large-R jets and boosted topology will also be discussed.

Orateur: Dr MADAR, Romain**Classification de Session:** Review of Experimental Results

ID de Contribution: 58

Type: **Non spécifié**

Recent developments in Dark Matter searches and Model Building

mercredi 7 septembre 2016 09:00 (1 heure)

Abstract : I will review in this presentation the last results and analysis in different approaches of dark matter, from the most effective construction to unified models of type $SO(10)$ through portal-like scenario.

Orateur: Prof. MAMBRINI, Yann

Classification de Session: Dark matter

ID de Contribution: 59

Type: **Non spécifié**

DM spin characterization at the LHC

mercredi 7 septembre 2016 10:30 (45 minutes)

Orateur: Dr PANIZZI, Luca

Classification de Session: Dark matter

ID de Contribution: **60**

Type: **Non spécifié**

Searches for FIMP Dark Matter at the LHC

mercredi 7 septembre 2016 11:15 (45 minutes)

Orateur: Dr MOLINARO, Emiliano

Classification de Session: Dark matter

ID de Contribution: 61

Type: **Non spécifié**

Composite Higgs model based on a conformal fixed point

mercredi 7 septembre 2016 14:00 (1 heure)

Abstract: We investigate a prototype lattice BSM model with pNGB Higgs by combining 4 light (massless) flavors and 8 heavy flavors. In the infrared, the $SU(4)$ chiral symmetry is spontaneously broken, while in the ultraviolet it exhibits the properties of the $N_f = 12$ conformal fixed point. The running coupling of this system “walks” and the energy range of walking can be tuned by the mass of the heavy flavors. At the same time, renormalization group considerations predict the spectrum of such a system to show hyperscaling i.e. hadron masses in units of F_π are independent of the heavy mass. Hyperscaling is present for bound states made-up of light, heavy, or heavy and light flavors. This observation is supported by numerical observations and makes the model strongly predictive.

Orateur: Prof. HASENFRATZ, Anna**Classification de Session:** Flavour and Lattice

ID de Contribution: 62

Type: **Non spécifié**

Topics on lattice studies of the Higgs-Yukawa Model

mercredi 7 septembre 2016 15:00 (1 heure)

In this talk, I will discuss the status of modern lattice investigations for the Higgs-Yukawa model. After introducing the main strategy, I will summarise how the lattice method can provide interesting information for LHC phenomenology. More details of two aspects in this research object will be given. The first is the effects of the addition of a dimension-six operator in low-energy phenomenology. The second is the investigation of the scaling behaviour of the model, as relevant to the investigation of the triviality of the Higgs-Yukawa sector of the Standard Model.

Orateur: Prof. LIN, David**Classification de Session:** Flavour and Lattice

ID de Contribution: 63

Type: **Non spécifié**

Recent anomalies in flavour physics

mercredi 7 septembre 2016 16:30 (45 minutes)

Orateur: Dr MAHMOUDI, Farvah

Classification de Session: Flavour and Lattice

ID de Contribution: **64**

Type: **Non spécifié**

Beautiful and charming physics on the lattice

mercredi 7 septembre 2016 17:15 (1 heure)

Orateur: Dr WITZEL, Oliver

Classification de Session: Flavour and Lattice

ID de Contribution: 65

Type: **Non spécifié**

Welcome words

lundi 5 septembre 2016 09:00 (15 minutes)

Orateur: Dr TIEULENT, Raphaël (Institut de Physique Nucléaire de Lyon)

Classification de Session: Composite Dynamics

ID de Contribution: 66

Type: **Non spécifié**

Current status of MSSM Higgs sector with LHC 13 TeV data

jeudi 8 septembre 2016 09:15 (45 minutes)

ATLAS and CMS collaborations have just reported the new results on Higgs search analyzing $\sim 15/\text{fb}$ data from Run-II of LHC at 13 TeV. In this work we study the Higgs sector of the phenomenological Minimal Supersymmetric Standard Model, in the light of the new Higgs data presented at ICHEP 2016, on and above the existing Run-I data, and comment on their relative impacts. We have observed that the new data has two major impacts on the parameter space: The first one is through the H to tau tau direct search limit which rules out the high $\tan\beta$ regions more efficiently than the Run-I data. Secondly, the correlated light Higgs observables as reported by ATLAS with Run-II data in the h to ZZ channel, which disfavors pseudoscalar mass below 450 GeV. Finally we discuss the possible decay modes of heavy Higgs bosons to supersymmetric particles.

Orateur: Mlle LAHIRI, Jayita

ID de Contribution: 67

Type: **Non spécifié**

Searches for Higgs pairs at LHC and its interpretations

jeudi 8 septembre 2016 10:30 (45 minutes)

Orateur: Dr CARVALHO, Alexandra