

# **IVICFA 's Fridays: THEORETICAL PHYSICS I**

## **Informe de contribuciones**

ID de la contribución : 0

Tipo : **no especificado**

## Light nuclei and hypernuclei from Lattice QCD

*viernes, 19 de septiembre de 2014 9:30 (35)*

I will present results on the study of baryonic interactions using Lattice QCD, including light nuclear systems up to a mass number of  $A=4$  and strangeness  $s=-2$ . The most recent calculations have been performed in the limit of flavor  $SU(3)$  symmetry and in the absence of electromagnetic interactions.

### Summary

**Presenter(s) :** PARREÑO, Assumpta (Universidad de Barcelona)

ID de la contribución : 1

Tipo : **no especificado**

## Strangeness in Nuclear Matter and Nuclei

*viernes, 19 de septiembre de 2014 10:10 (35)*

Strange hadrons in nuclear matter and nuclei are analyzed within different frameworks, paying a special attention to unitarized coupled-channel approaches. Possible experimental signatures of the properties of these mesons in matter are addressed, in particular in connection with the future FAIR facility at GSI.

### Summary

**Presenter(s) :** TOLOS, Laura (ICE, Barcelona)

ID de la contribución : 2

Tipo : **no especificado**

## **On the flavor composition of the high-energy neutrinos in IceCube**

*viernes, 19 de septiembre de 2014 11:15 (35)*

The IceCube experiment has recently released 3 years of data of the first ever detected high energy neutrinos, which are consistent with an extraterrestrial origin. In this talk I will discuss the compatibility of this observation with possible combinations of neutrino flavors and its implications.

### **Summary**

**Presenter(s) :** PALOMARES-RUIZ, Sergio (IFIC)

ID de la contribución : 3

Tipo : **no especificado**

## Neutrino-nucleus interactions

*viernes, 19 de septiembre de 2014 12:30 (35)*

A review of the nuclear effects when the nucleon interacting with a neutrino is part of a nucleus are reviewed. The language common to theoretical methods will be presented, as well as the experiment counter part. A survey of recent experimental results will be included in this review.

### Summary

**Presenter(s) :** UDIAS, José Manuel (Universidad Complutense de Madrid)

ID de la contribución : 4

Tipo : **no especificado**

## Neutrino cross sections: progress and open questions

*viernes, 19 de septiembre de 2014 11:55 (35)*

New and more precise measurements of neutrino cross sections have renewed interest in a better understanding of electroweak interactions on nucleons and nuclei. This effort is crucial to achieve the precision goals of the neutrino oscillation program, making new discoveries, like the CP violation in the leptonic sector, possible. I review the recent progress in the physics of neutrino cross sections, putting emphasis on the open questions that arise in the comparison with new experimental data.

### Summary

**Presenter(s) :** ALVAREZ RUSO, Luis (IFIC)

ID de la contribución : 5

Tipo : **no especificado**

## Non-ordinary light meson couplings and the $1/N_c$ expansion

*viernes, 19 de septiembre de 2014 14:45 (35)*

We study the large  $N_c$  behavior of couplings among light meson states with different compositions in terms of quarks and gluons. We shortly review the most common compositions of mesons, which are of interest for the understanding of low-lying meson resonances, namely, the ordinary quark-antiquark states as well as the non-ordinary, glueball, tetraquark, etc. We dedicate special attention to Jaffe's generalization of the tetraquark with  $N_c-1$   $q\bar{q}$  pairs, that is the only type of state we have identified, whose width does not necessarily vanish with  $N_c$ , while it does decouple exponentially with  $N_c$  from the  $\pi\pi$  channel, so that is weakly coupled to the meson-meson system.

### Summary

**Presenter(s) :** LLANES-ESTRADA, Felipe (Universidad Complutense de Madrid)

ID de la contribución : 6

Tipo : **no especificado**

## Heavy Quarkonium with effective field theories

*viernes, 19 de septiembre de 2014 15:25 (35)*

We review weakly-bound heavy quarkonium systems using effective field theories of QCD. We concentrate on potential Non-Relativistic QCD, which provides with a well founded connection between QCD and descriptions of the heavy quarkonium dynamics in terms of Schrödinger-like equations. This connection is obtained using standard quantum field theory techniques such as dimensional regularization. Renormalization group equations naturally follow. We also briefly review some applications, which include spectroscopy, radiative transitions, Non-Relativistic sum rules, inclusive decays, and electromagnetic threshold production.

### Summary

**Presenter(s):** PINEDA, Antonio (Universidad Autónoma de Barcelona)

ID de la contribución : 7

Tipo : **no especificado**

## Improved tau-weapons for Higgs hunting

*viernes, 19 de septiembre de 2014 16:05 (35)*

In this work, we use the results from Higgs searches in the  $\gamma\gamma$  and  $\tau\tau$  decay channels at LHC and indirect bounds as  $\text{BR}(B$

$toX_\gamma)$  to constrain the parameter space of a generic MSSM Higgs sector. In our analysis, we reduce to the minimum the model input and use only experimental information to restrict the scalar masses and mixings. In particular, we include the latest CMS results that look for additional Higgs states with masses up to 1 TeV. We show that the  $\tau\tau$  channel is the best and most accurate weapon in the hunt for new Higgs states beyond the Standard Model. We obtain that present experimental results rule out additional neutral Higgs bosons in a generic MSSM below 300 GeV for any value of  $\tan\beta$  and, for instance, values of  $\tan\beta$  above 30 are only possible for Higgs masses above 600 GeV.

### Summary

**Presenter(s) :** VIVES, Oscar (IFIC)

ID de la contribución : 8

Tipo : **no especificado**

## **Introduction and welcome by IVICFA Chairman**

*viernes, 19 de septiembre de 2014 9:25 (5)*

### **Summary**

**Presenter(s) :** Prof. BERNABEU, Jose (IFIC - Valencia)