Organizing ANDES: present status and prospects

Osvaldo Civitarese (Universidad de La Plata)

The talk is devoted to the presentation of the current status of ANDES as an international lab. We shall present the proposal related to the CLES (the ANDES consortium), and discuss the possibilities concerning financial, academic and social aspects which are open by the ANDES project. We shall, as well, compare all these aspects with the ones pertaining to similar labs around the word.

ANDES: a survey of the physics related to underground labs

Osvaldo Civitarese (Universidad de La Plata)

The talk is devoted to a brief presentation of the open problems in neutrino physics. The survey will focus on the possible experiments which may be performed in the ANDES lab. The role of neutrinos in different physical processes is discussed in connection with the neutrino mass hierarchy and mixing parameters, the interactions between active and sterile neutrinos, neutrino fluxes from supernovae, decoherence, and dark matter scenaries.

Quantum Decoherence and CPT Violation at DUNE

Felix Napoleao Diaz Desposorio (PUC-Peru)

We study the CPT violation due to the quantum decoherence. We develop analytical approaches for long-baseline experiments considering the effect of matter and quantum decoherence valid up to $\Gamma \sim 10 ^{-23} GeV$ and for a range of energy 0.5 GeV - 20 GeV. We theoretically analyze the impact of each case with CPTV through the channels ν_{μ} and $\overline{\nu}_{\mu}$ disappearance. In the context of DUNE, we proposed an observable to study and differentiate the CPTV due to the effect of quantum decoherence from the CPTV due to the matter effect. We simulate the DUNE experiment using nuSQuIDS package and GLoBES software. We found cases with up to 5 σ of confidence for $\Gamma \sim 10 ^{-23} GeV$.

ANDES Status and Update

Claudio Dib (Universidad Técnica Federico Santa María)

I may give a brief presentation of the update of ANDES, in particular the situation in Chile.

DAMIC-SENSEI, looking for DM with CCD

Juan Estrada (FERMILAB)

Results from a tonne-year exposure with XENON1T

Ran Itay (Tel Aviv University)

The XENON1T experiment is the first liquid xenon tonne-scale dual-phase TPC dark matter detector, currently operating at LNGS Italy. The first scientific run, lasting 34.2 live-days, had set the most stringent limits on the spin-independent WIMP-nucleon interaction. This was possible mainly due to the lowest background ever achieved in a dark mater detector. Since then XENON1T continued acquiring data, ending the second scientific run in February 2018. This run collected data from ~250 live-days, setting a lowest limit of 4.1 X 10-47 cm2 for a 30 GeV/c2 WIMP mass. In this talk I will discuss the combined analysis of the two scientific runs, reaching an exposure of ~1 tonne-year, and exploring WIMP-nucleon cross section to unprecedented levels.

CTVAL/UTFSM Detector Laboratory

Sergey Kuleshov (Universidad Técnica Federico Santa María)

New Physics Results from Darkside-50

Maximo David Ave Pernas (IF-USP)

The latest results on spin-independent cross sections for WIMP-Nucleon interaction from the Darkside-50 experiment will be presented.Two discrimination techniques (spectral shape and pulse shape discrimination) are used to set limits in a wide range of WIMP masses.

The CUPID-Mo experiment

Loaiza Pia (CNRS/ Univ. Paris Saclay)

CUPID-Mo is a search for neutrinoless double beta decay in 100-Mo based on scintillating bolometers, presently running at the Laboratoire Souterrain de Modane in France. CUPID-Mo is built on the successfull LUMINEU program which demonstrated an excellent energy resolution of 5 keV at FWHM at 2615 keV and a surface alpha background rejection on the level of about 9 sigma using four Li2MoO4 scintillating bolometers. The first phase of CUPID-Mo consisting of 20 detectors (4.2 kg) installed in the Edelweiss-III cryostat, is ready to take data. A second phase with 20 additional detectors is foreseen to be installed in LNGS. The estimated sensitivity for the neutrinoless half-life for the two phases after 3 years of running is 1.5 x 10^25 years. CUPID-Mo is part of the CUPID program, a proposed tonne-scale bolometric 0vBB experiment aiming at exploring the inverted ordering region of the neutrino mass. It will be built on the experience, expertise and lessons learned in CUORE, the currently most sensitive bolometric experiment, and will exploit the present CUORE infrastructure as much as possible. In order to achieve its ambitious science goals, CUPID aims to increase the source mass and dramatically reduce the backgrounds in the region of interest.

ANDES-GEO: Current design considerations

Andreas Rietbrock (KIT Karlsruhe Institute of Technology)

This talk will give an overview of the ANDES-GEO initiative to integrate a geophysical and geoscientific observatory into the ANDES project.

A simple simulation of the IceCube neutrino telescope

Boris Alejandro Panes Saavedra (Instituto de Fisica, Universidade de Sao Paulo)

The main mission of the IceCube neutrino telescope is to measure astrophysical high energy neutrinos, which in general are associated to the production and acceleration of cosmic rays. However, this experiment also can be used to analyze BSM physics. In order to investigate this possibility we have computed systematically some relevant experimental features of this experiment. In this way we can consider different spectra for the incoming neutrinos, which can be used to analyze unstable heavy dark matter decays and variable neutrino flavor composition of the incoming flux in general. Also, we can use these tools to include new interactions at detector level and during the propagation of high energy neutrinos through earth. We suggest that this approach could be used to analyze future neutrino detectors at ANDES.

SESAME, an example to follow for ANDES?

Zehra Sayers (SESAME organization)

SESAME (Syncrotron-light for Experimental Science and Applications in the Middle East), is an international synchrotron radiation laboratory located in Jordan and established under the auspices of UNESCO. Members of SESAME, Cyprus, Egypt, Iran, Israel, Jordan, Palestinian Authority, Pakistan and Turkey, are countries that are not often seen sitting around the same table and working towards a common goal. Mission of SESAME is to foster world-class science and technology in the Middle East and neighboring countries, and to facilitate

cooperation across political and cultural divides. I will provide brief information on the critical points and events in the history of SESAME during its establishment, as well as its governance and finance structures and adopted strategies. I will also talk about the importance of factors such as commitment of the members to the project, presence of UNESCO, transparency of its structures, training programs and local and international support that contributed to the

success of SESAME. Finally I will address some points, which are likely to be useful for the ANDES project.

Theoretical calculations of neutrino-nucleus scattering for supernova neutrinos

Emanuel Arthur Ydrefors (Instituto TecnolÃ³gico de Aeronautica)

Knowledge about the neutrino and its interaction with matter is important for many applications in astrophysics as well as particle physics. Accurate cross sections for charged-current (CC) and neutral current (NC) neutrino interactions on nuclei are important as inputs in supernova simulations, but also for the interpretation of the results from current/future experiments. Additionally, coherent neutrino scattering could be a background for future Dark Matter, and an accurate knowledge of the cross section are thus indispensable. In this talk we present computed cross sections [1,2,3, 4] for the CC and NC scatterings off nuclei, for relevant nuclear targets such as the xenon, lead and molybdenum isotopes, using realistic nuclear models. [1] W. Almosly et al, Phys. Rev. C 94 (2016) 044614. [2] E. Ydrefors et al, Phys. Rev. C 91 (2015) 014307. [3] E. Ydrefors and J. Suhonen, Phys. Rev. C 87 (2013) 034314. [4] P. Pirinen et al, arXiv: 1804. 08995.

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List of Abstracts