# Jeudi 18 Avril 2024

## Day 2 - Session 3: 10h00 – 11h30 • Amphi Dirac

2nd Year PhD Series 2023/24

## Baptiste FILOCHE – Groupe Théorie

### Non-Perturbative Aspects of Supersymmetric Gauge Theories

Quantum field theories are essential for studying fundamental interactions.

In this framework, some physical observables can be calculated using perturbative expansions. However, achieving non-perturbative description remains challenging yet essential for understanding strongly coupled theories.

In this presentation, I will discuss supersymmetric gauge theories wich are a class of quantum field theories that involve a symmetry relating bosonic and fermionic degrees of freedom. In this theories, recent developments have uncovered geometric and algebraic structures that allow to compute non-perturbative observables.

I will review the construction of a class of supersymmetric gauge theories that arise in the context of string theory and detail some of their properties from both geometric and algebraic viewpoints.

## Yann MONCEAUX – Groupe Théorie

### Theories of New Physics and B-meson

Deviations from the Standard Model have long been observed in semileptonic B-meson decays, notably b→ sll transitions, triggering speculations on potential New Physics effects in this sector.

After recent updates, the sole remaining significant deviations from the SM in flavour-changing neutral currents B decays are found in observables that are theoretically challenging to predict. Their high sensitivity to non-perturbative QCD contributions can clearly hamper the potential of these observables for discovery.

The goal of this thesis is to accurately assess the uncertainties in the prediction of these observables, before turning to model building to explain the remaining anomalies. This presentation will focus on the first part.

## Amazigh OUZRIAT – Groupe Ondes Gravitationnelles

### Detection of Compact Binary Coalescences by LIGO-Virgo-Kagra Collaboration

In this presentation, we explore advancements in gravitational wave astronomy through the LIGO-Virgo-KAGRA (LVK) collaboration's detection of compact binary coalescences (CBCs) using the Multi-Band Template Analysis (MBTA) pipeline.

We briefly cover the essence of gravitational waves, the structure and achievements of the LVK collaboration across three previous observing runs as well as the ongoing fourth observing run.

Additionally, we highlight my work on integrating the iDQ framework into the MBTA pipeline to flag and reduce the impact of glitches, thereby enhancing the accuracy and reliability of gravitational wave detections.

Lien agenda: https://indico.in2p3.fr/event/32778/