Invitation à la soutenance publique de thèse de
Madame Elisa MINUCCI
Master in Physics

Pour l’obtention du grade de Docteur en sciences

« Search for Lepton Number and Flavor violations in Kaon decays at the NA62 experiment »

qui se déroulera

le mardi 20 novembre 2018 à 10h30
Auditoire CYCL 01
Chemin du Cyclotron, 2
1348 Louvain-la-Neuve

Membres du jury :

Prof. Eduardo Cortina Gil (IRMP – CP3, UCLouvain, Belgium), supervisor
Prof. Giacomo Bruno (UCLouvain), chairperson
Prof. Jean-Marc Gerard (IRMP – CP3, UCLouvain, Belgium), secretary
Prof. Cristina Lazzeroni (University of Birmingham, England)
Dr. Tommaso Spadaro (National Laboratory of Frascati, Italy)

The elementary particles and their interactions find their better description in the Standard Model. Nevertheless there are open theoretical and experimental issues which are not explained by the SM. For this reason nowadays particle physics experiments are focused on searches of New Physics (NP) effects. The work presented in this thesis has been carried out using the data collected at the NA62 experiment at CERN. Its main goal is to measure the Flavor Changing Neutral Current decay, \( K^+ \to \pi^+ \nu \bar{\nu} \), with an accuracy of same level of the theoretical prediction in order to both test the SM and search for NP. Thanks to the high-intensity setup, the trigger system flexibility, and detector performance NA62 is suitable for searching NP effects from different scenarios. The study presented aims at contributing to new physics searches looking for Lepton Number and Flavor violations in charged kaon decays, focusing on the \( K^+ \to \pi^+ \mu^+ e^- \), \( K^+ \to \pi^+ \mu^- e^+ \) and \( K^+ \to \pi^+ e^+ \) channels. The analysis has been performed blinding the signal region, defined as the region around the K mass in the three tracks invariant mass spectrum. The results have been obtained analyzing \( 17 \times 10^{10} \) kaon decays from 2016 and 2017 data taking. In the work the selection criteria developed are presented. The performance of the method for the multi-tracks vertex reconstruction, of the particle identification procedure and the study of all possible background sources are presented. The estimated Single Event Sensitivity and the preliminary results obtained with the Rolke-Lopetz method show improvements on the present experimental limits in the \( K^+ \to \pi^+ \mu^- e^+ \) and \( K^+ \to \pi^+ \mu^+ e^- \) channels, while for \( K^+ \to \pi^+ e^- \) more statistics is needed.