



Contribution ID: 371

Type: Poster

Dual-Polarity Ion Drift Chamber: Experimental results with Xe-SF₆ mixtures

Friday, 27 May 2022 09:04 (1 minute)

A new experimental system was recently developed by our group to measure the mobility of both positive and negative ions: the Dual-Polarity Ion Drift Chamber (DP-IDC). This new system is intended to foster the understanding of transport properties of ions in gases, as these are specially relevant for the performance of gaseous detectors, namely in large volume ones, in particular for the development/optimization of the performance of Negative Ion Time Projection Chambers (NITPCs) for rare event searches such as the experiments CYGNUS, XENON or NEXT. The optimization/fine tuning of gas mixtures for such detectors gains special relevance as drift of negative ions in these detectors can significantly affect the signal formation, the tracking capability and spatial resolution, eventually limiting their rate capability. In addition, a comprehensive understanding of the different ion species expected in particular gas mixtures, can also be of extreme importance as it may allow to identify potential minority charge carriers (negative ions) which are the basis for the development of additional internal trigger methods in NITPCs while enabling to further reduce the background on such detectors.

In this work, we present a description of the experimental setup and technique used, and the initial studies carried out in mixtures of interest in NITPC's, namely in Xe-SF₆ mixtures, whose interest has attracted attention as a possible alternative in searches for the neutrinoless double-beta decay.

Collaboration

Primary authors: Mr MARQUES, A. P. (Laboratory of Instrumentation and Experimental Particle Physics - LIP); Prof. I. G. M. BORGES, Filipa (Physics Department - University of Coimbra); Dr CORTEZ, A.F.V. (Institute of Experimental and Applied Physics, Czech Technical University in Prague); Mr TRINDADE, A.M.F. (Laboratory of Instrumentation and Experimental Particle Physics - LIP Coimbra); Mr MARQUES, D. J.G. (Gran Sasso Science Institute); Prof. SANTOS, F. P. (Department of Physics, Faculty of Sciences and Technology, University of Coimbra); Dr ESCADA, J. (Laboratory of Instrumentation and Experimental Particle Physics - LIP Coimbra); Mr TELES, J.P.M. (Department of Physics - University of Coimbra); Mrs DUARTE, N.G.S. (Department of Physics - University of Coimbra)

Presenter: Prof. I. G. M. BORGES, Filipa (Physics Department - University of Coimbra)

Session Classification: Gas Detectors - Poster session