Contribution ID: **50** Type: **oral presentation**

Pattern recognition techniques to reduce backgrounds in the search for the 136Xe double beta decay with gaseous TPCs

Wednesday, 10 April 2013 12:50 (20 minutes)

The observation of the neutrinoless double beta decay may provide essential information on the nature of neutrinos. Among the current experimental approaches, a high pressure gaseous TPC is an attractive option for the search of double beta decay due to its good energy resolution and the detailed topological information of each event. We present in this talk a detailed study of the ionization topology of the 136Xe double beta decay events in high pressure xenon, as well as that of the typical competing backgrounds. We define some observables based on graph theory concepts to develop automated discrimination algorithms. Our criteria are able to reduce the background level by about three orders of magnitude in the region of interest of the 136Xe Q_bb for a signal acceptance of 40%. This result provides a quantitative assessment of the benefit of topological information offered by gaseous TPCs for double beta decay search, and proves that it is a promising feature in view of future experiments in the field. Possible ideas for further improvement in the discrimination algorithms and the dependency of these results with the gas diffusion and readout granularity will be also discussed.

Primary author: Dr IGUAZ GUTIERREZ, Francisco Jose (University of Zaragoza)

Co-authors: Mr TOMAS, Alfredo (University of Zaragoza); Ms HERRERA, D.C. (University of Zaragoza); Dr LUZON, Gloria (University of Zaragoza); Dr GOMEZ, Hector (Laboratoire de l'Accélérateur Linéaire (LAL)); Dr IRASTORZA, Igor (U. Zaragoza); Ms SEGUI, Laura (University of Zaragoza); Dr CEBRIAN, SUSANA (UNIVERSITY OF ZARAGOZA); Dr DAFNI, Theopisti (University of Zaragoza)

Presenter: Dr IGUAZ GUTIERREZ, Francisco Jose (University of Zaragoza)

Session Classification: Session 3 - Low background counting techniques

Track Classification: Low background counting techniques