

# **The NUMEN project: preliminary results from $> 116\text{Sn}(18\text{O},18\text{Ne})116\text{Cd}$ DCEX reaction at 270 MeV with MAGNEX**

*Tuesday, 15 November 2016 11:35 (12 minutes)*

## **Summary**

The knowledge of Nuclear Matrix Elements (NME), that enter in the expression of the half-life of the neutrinoless double beta decay ( $0\nu\beta\beta$ ), is a key aspect for the extraction of the neutrino mass from these measurements. Relevant information on the NME can be obtained by measuring the cross sections of double charge exchange nuclear reactions (DCEX). The basic point is that the initial and final-state wave functions in the two processes are the same and the transition operators are similar.

First pioneering experimental results for the  $40\text{Ca}(18\text{O},18\text{Ne})40\text{Ar}$  reaction at 270 MeV Superconducting Cyclotron (K800) beam incident energy has been obtained at the INFN-LNS laboratory in Catania using the MAGNEX large acceptance magnetic spectrometer, at zero degrees.

On the basis of the above mentioned ground-breaking achievement, the NUMEN project has been proposed with the aim to go deep insight in the HI-DCE studies on nuclei of interest in  $0\nu\beta\beta$  decay, looking forward at the  $0\nu\beta\beta$  NME determination.

In this work, some preliminary results achieved from the  $116\text{Sn}(18\text{O},18\text{F})116\text{In}$  single charge exchange reaction and  $116\text{Sn}(18\text{O},18\text{Ne})116\text{Cd}$  DCEX reaction at 270 MeV incident energy will be shown.

**Primary author:** SANTAGATI, Gianluca (LNS)

**Co-authors:** FOTI, Antonino (CT); AGODI, Clementina (LNS); Ms CARBONE, Diana (LNS); CAPPUZZELLO, Francesco (LNS); CAVALLARO, Manuela (LNS); Dr ZAGATTO, Vinicius (INFN-LNS)

**Presenter:** SANTAGATI, Gianluca (LNS)

**Session Classification:** Presentazioni giovani ricercatori: Struttura nucleare e dinamica delle reazioni