Contribution ID: **57** Type: **not specified**

Tz=-1 -> 0 beta decays and the DeltaT=0, M1 transition ”quasi-rule”

Wednesday, 29 June 2011 12:20 (20 minutes)

We have studied the Tz = -1 ⟶ 0 beta decays of 42Ti, 46Cr, 50Fe and 54Ni to the self-conjugate nuclei 42Sc, 46V, 50Mn, and 54Co respectively.
The nuclei of interest were produced in the fragmentation of a 58Ni beam of 680 MeV/nucleon from the SIS-18 synchrotron at GSI. The ions produced and separated using the Fragment Separator (FRS) were identified by Z and A on an event-by-event basis. The selected heavy ions (HI) were implanted into a DSSSDs detector surrounded by RISING CLUSTAR array. In the analysis of the HI-beta or HI-beta-gamma correlations it was possible to a) measure the beta-decay half-lives with one order-of-magnitude better accuracy than the values existing in the literature, b) establish decay schemes, c) determine the direct ground state to ground state feeding in the decays, d) measure the decay intensity to the 1+ states populated in the daughter and hence the B(GT) values for the Gamow-Teller beta decays.
The B(GT) values are of importance in terms of comparison with the analogous (3He,t) reactions on the mirror nuclei (Fujita et al.,PRL95(2005)212501).
An interesting observation in these experiments is the predominant M1 decay of the T=0, 1+ states populated in the beta decay to the T=1, 0+ g.s. No M1 gamma transitions were observed to any other T=0, 1+ excited states. This is consistent with the absence of the IV term in the M1 transition probability here since it cannot connect states with T=0, in contrast with the general case where the IV dominates the M1 transition probability. This selection rule, called a “Quasi-rule”by Warburton and Weneser (D.H. Wilkinson “Isospin in Nuclear Physics” , 1969, SBN 7204 0155 0) is observed for the first time in the fp shell nuclei.

Primary author: RUBIO, Berta (IFIC CSIC Valencia)

Co-authors: MOLINA, Francisco (IFIC- CSIC Valencia); GELLETLY, William (University of Surrey); FUJITA, Yoshitaka (University of Osaka)

Presenter: RUBIO, Berta (IFIC CSIC Valencia)

Session Classification: Prespec/Despec