



Contribution ID: 160

Type: Poster

Nuclear structure studies of exotic nuclei: the case of ^{31}Ar

The ^{31}Ar nucleus is one of the most exotic β -delayed particle precursors, at the proton drip-line, with high Q -value and low proton separation energy. Therefore, different decay modes are open ($\beta 1p$ - $\beta 3p$) [1]. The aim of the IS577 experiment performed at the ISOLDE Decay Station (IDS-CERN) [2] was to provide relevant information on the resonances of ^{31}Cl and ^{30}S , populated in the beta decay of ^{31}Ar .

The set-up used consisted of 5 Double Sided Si Strip Detectors (DSSD) backed by un-segmented Si-pad detectors in ΔE - E telescope configuration. This Si-array is located inside the new MAGISOL Si-Plugin Chamber, installed at the new permanent station IDS, devoted to β -decay measurements. In addition, there are 4 HPGe clover-detectors surrounding the chamber for gamma detection. This set-up is very compact with both high efficiency ($\Omega_p=45.5\%$) and good energy resolution (25 keV) for multi-particle emission, needed to characterize the different p -channels of ^{31}Ar .

New results will be presented here, such as the observation of new proton transitions and the identification of new excited states of ^{31}Cl thanks to the proton-gamma coincidence technique. In addition, three new levels of ^{30}S in the range from 8 up to 9 MeV of excitation energy have been observed extending the knowledge of excited state in ^{30}S to higher energies. Furthermore, we have experimentally determined for the first time the partial proton-gamma width of several states of ^{30}S located just above the proton separation energy, relevant for the astrophysical rp -process, present in certain stellar environments such as classical novae [3]. Our experimental determination of the values of partial widths can reduce the uncertainty in the values of the rate of the $^{29}\text{P}(p,\gamma)^{30}\text{S}$ reaction.

[1] G.T. Koldste et al., Phys. Rev. C 89, 064315 (2014)

[2] <http://isolde-ids.web.cern.ch/isolde-ids/>

[3] G.T. Koldste et al. Phys. Lett. B 737 (2014) 383-387.

Primary author: MARROQUIN ALONSO, Irene (IEM-CSIC)

Co-authors: Prof. TENGBLAD, Olof (IEM - CSIC); Dr NACHER, Enrique (IEM-CSIC); BORGE, M. J. G. (Instituto de Estructura de la Materia, CSIC, E-28006 Madrid, Spain); Mr PEREA, Angel (IEM-CSIC)

Presenter: MARROQUIN ALONSO, Irene (IEM-CSIC)

Session Classification: POSTER SESSION