



Contribution ID: 83

Type: Oral

Spectroscopy of low-lying excited states of ^{50}Ar

Thursday, 16 May 2019 17:50 (20 minutes)

An interesting aspect of nuclear structure is the shell evolution for isotopes with extreme isospin values. Experimental evidence show the presence of a sub-shell closure at $N = 32$ for ^{52}Ca , ^{54}Ti and ^{56}Cr . Mass measurements on $^{52,53}\text{K}$ suggest that this sub-shell closure is maintained below $Z=20$. For the case of the ^{48}Ar , low lying $2+$, $4+$ and the second $2+$ states, as well as the $B(E2)^\uparrow$ value have been accessed using different techniques, and a triaxial character has been suggested. A recent γ -ray spectroscopy measurement of ^{50}Ar , reported an energy of the first $2+$ state of 1178(18) keV. The satisfactory reproduction of this experimental results by shell model calculations indicated the conservation of the shell gap at $N = 32$ for Ar isotopes. In the same measurement, a tentative transition with energy of 1582(38) keV was suggested to correspond to the $4+ \rightarrow 2+$ transition. However, the limited statistics did not allow for a coincidence analysis to obtain any definitive conclusion on the existence of the peak, nor on spin and parity assignments. To further investigate the nature of the $N=32$ shell gap below Ca, the analysis of different reaction channels populating ^{50}Ar is of high importance.

We will report on the preliminary results of the measurements of proton and neutron knockout reactions as well as inelastic scattering populating ^{50}Ar performed at RIKEN within the third SEASTAR campaign. Isotopes of interest were produced after the fragmentation of a ^{70}Zn beam at 345 MeV/u on a Be target and identified with BigRIPS. Selected isotopes were focused onto the liquid-hydrogen target of the MINOS device and gamma rays from the reactions were detected with the DALI2+ array. Outgoing particles were identified using the SAMURAI magnet and related detectors. Preliminary results on the spectroscopy of low-lying levels for ^{50}Ar will be presented and the cross sections to populate the different states from different reaction channels will be discussed.

Primary author: CORTÉS, Martha Liliana (INFN-LNL)

Co-authors: RODRÍGUEZ, Wilmar (U. Nacional de Colombia); DOORNENBAL, Pieter (RIKEN Nishina Center); OBERTELLI, Alexandre (TU Darmstadt); COLLABORATION, and the SEASTAR

Presenter: CORTÉS, Martha Liliana (INFN-LNL)

Session Classification: Session XXII (Parallel Session)