

Spectroscopy around N=20 shell closure: β-n decay studies of $^{32,33}\text{Mg}$ and $^{34,35}\text{Al}$.

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An experimental spectroscopic investigation of some neutron rich Mg and Al isotopes around the shell closure N=20 at performed. The delayed neutron and γ spectra, following the β -decay of $^{32,33}\text{Mg}$ and $^{34,35}\text{Al}$ have been measured using the delayed neutron detector array TONNERRE coupled with high efficiency γ - EXOGAM clover detectors, one LEPS of Surrey and eight low energy neutron detectors from IReS Strasbourg [1],[2]. A detailed analysis of such spectra allows one to construct the level schemes of their daughters, $^{31,32,33}\text{Al}$ and $^{33,34,35}\text{Si}$. The resulting spectroscopic information will provide stringent tests of large scale shell model calculations including np – nh excitations aimed at the understanding of the structural effects occurring in this region. For example, the figure 1 below shows the decay scheme of ^{35}Al deduced from these measurements [3]. Based on triple β - γ -n coincidences, eight new levels above the neutron separation energy in ^{34}Si were for the first time observed. In addition, we have reported the $\log ft$ and intensity values for the transitions associated. These levels will be compared with the few previously existing data and shell models calculations [4].

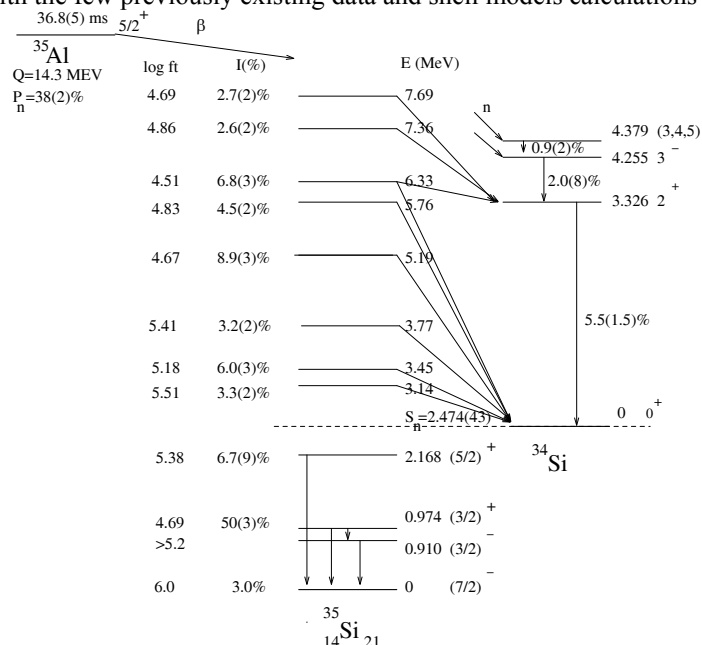


Figure 1: Decay scheme proposed for ^{35}Al .

References:

- [1] A. Buta et al: NIMA 455/2 412-423.
- [2] J.C. Angélique et al: GANIL Proposal E333 and references therein.
- [3] C. Timis, PhD Thesis, Caen University, 13 september, 2001.
- [4] S. Nummela et al, Phys. Rev. C63 (2001). 044316.