

The resonances of ^{30}S and the $^{29}\text{P}(p,\gamma)^{30}\text{S}$ reaction

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The nucleus ^{30}S is situated at the proton drip line and thus plays an important role in the rp- and alpha-p-process via the $^{29}\text{P}(p,\gamma)^{30}\text{S}$ reaction. The astrophysical relevant resonances are situated just above the proton threshold. We have studied the nucleus through beta-delayed proton decays of ^{31}Ar in the IS476 experiment.

Knowledge of the resonances just above the proton threshold of ^{30}S is limited. The energies of the two resonances predicted to dominate the $^{29}\text{P}(p,\gamma)^{30}\text{S}$ reaction have recently been measured by Setoodehnia et al. Previously, no experiment has been able to measure the proton and gamma partial widths of these resonances. With our latest experiment made in 2009, which incorporated a segmented Si-particle array and two Miniball gamma detectors, it is possible to measure both protons and gammas from these resonances and thereby estimate the proton to gamma partial width ratio.

We have only been able to positively identify the gammas from the lowest of these two resonances at 4687(4) keV. Due to a substantial amount of electronic noise and beta background the protons from this resonance have not been identified. Instead, we have been able to put an upper limit on the ratio.

In November 2012 there will (hopefully) be a new experiment with an improved setup for detection of low-energy protons. The target group has made improvements to the target and ion-source so the hope is to get a substantially higher yield of ^{31}Ar .

The latest results of the analysis of both experiments will be presented.

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