

Study of $N = 16$ for Ne isotopes

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$N = 16$ has been recently suggested to be magic near the neutron drip line, both theoretically [1] and experimentally [2]. This may arise from an enhancement with isospin of the gap between the $s_{1/2}$ and $d_{3/2}$ of the sd neutron shell. Information may be given by the single particle excitations in $N = 17$ isotones, especially about the gap between the $d_{3/2}$ subshell and the next fp major shell.

The $N=17$ isotope ^{27}Ne , for which very little information are available, has been studied at Ganil in the $^{26}\text{Ne}(d,p)^{27}\text{Ne}$ transfer in inverse kinematics with the ^{26}Ne beam of the SPIRAL facility at 9.7 A.MeV. The EXOGAM spectrometer was coupled to the magnetic VAMOS facility and we measured coincidences between the ejectiles detected in the focal plane of VAMOS and the photons emitted in flight at the target [3]. Below the one neutron emission threshold, we observed two transitions consistent with the decay of two excited states towards the ground state. One of them is possibly a low-lying negative parity state from the fp shell. Also measured was ^{25}Ne produced in the (d,t) channel [4].

The results will be discussed and compared to other experiments done recently on the same mass region, related to the existence of a possible $N=16$ shell closure.

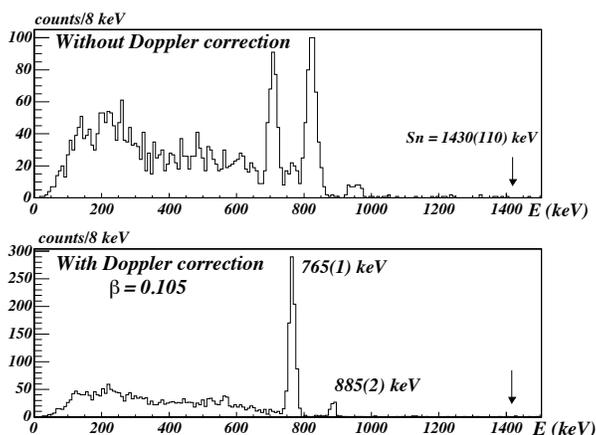


Figure 1: (top) Energy spectrum of photons emitted in coincidence with ^{27}Ne ejectiles detected in the focal plane of VAMOS, (bottom) after Doppler shift correction using the segmentation of the EXOGAM spectrometer. The arrow stands for the one neutron emission threshold in ^{27}Ne .

[1] T. Otsuka et al., Phys. Rev. Lett. 87 082502 (2001); A. Obertelli et al., Phys. Rev. C71 024304 (2005) .

[2] A. Ozawa et al., Phys. Rev. Lett. 84 5493 (2000).

[3] A. Obertelli et al., Phys. Lett. B 633 (2006) 33.

[4] A. Obertelli et al., submitted to Phys. Rev. C