^{2}H(^{20}Mg,D) 2019Ra06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, G. C. Sheu	ENSDF	20-June-2019

2019Ra06: XUNDL dataset compiled by TUNL, 2019.

Radioactive ^{20}Mg ions were produced in the bombardment of a SiC target by 480 MeV protons at TRIUMF; the ^{20}Mg nucleons were collected and reaccelerated to 8.5 MeV/nucleon using the ISAC-II Linac before finally impinging on a windowless solid deuterium target that was formed on a 4.5 μm thick cryogenically cooled silver target.

The incident ^{20}Mg ions were identified using an ionization chamber positioned upstream of the target, while scattered deutrons and residual beam ions were detected using position sensitive annular ΔE-E arrays that covered θ=30.1°−56.2° and θ=1.9°−6.1°, respectively. The ^{20}Mg excitation energies were deduced from kinematic analysis of the scattered deutrons. The observed spectrum was corrected for reaction yields associated with the Au backing target and with breakup into the four-body ^{18}Ne+p+p+d phase space.

Evidence for four states is observed, including previously unreported groups at E_x≈3.7 MeV and 5.37 MeV. The angular distribution of ^{20}Mg(1.65 MeV) confirms $J^\pi=2^+$ and indicates the quadrupole deformation parameter β_n=0.46 *21*. The analysis of the 3.7 MeV group is centered on discussion related to predicted $J^\pi=4^+_1$ and 2^+_2 states that are expected near this region. The angular distribution is not consistent with L=2 or L=4, which may suggest this group represents a $J^\pi=2^+_2+4^+_1$ doublet. The angular distribution of the E_x≈5.37 MeV group is not analyzed.

^{20}Mg Levels

E(level)	J^π	Γ (MeV)	Comments
0	0^+		
1.65×10^3 *10*	2^+		E(level): From $E_x=1.65^{+2}_{-10}$ MeV. β_n=0.46 *21* (2019Ra06).
3.70×10^3 *20*	$(2^+,4^+)$	0.47 MeV *6*	E(level): From $E_x=3.70^{+2}_{-20}$ MeV. J^π: From Shell Model expectations of $J^\pi=4^+_1$ and 2^+_2 states in this region.
5.37×10^3 *2*			