^{27}Al(d,t) 2015Sr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia and A. M. Hurst	NDS 134,1 (2016)	1-Feb-2016

$J^\pi(^{27}\text{Al g.s.})=5/2^+$.

Target: Self-supported ^{27}Al target of thickness 90 μg/cm^2; Projectile: deuteron beam, E=25−MeV. Transfer-channel angular distributions were measured with a three-element telescope comprising a single-sided 55 μm Si (ΔE) strip detector, a double-sided 1030 μm Si (E) strip detector, backed by four CsI(Tl) detectors. Ejectiles were measured over an angular range from 16 to 40 degrees in the lab. Excited states were measured in ^{26}Al and analyzed using a zero-range distorted-wave Born approximation (DWUCK4) to extract spectroscopic factors and *L*-transfer values for the observed states. Results compared with previous measurements.

^{26}Al Levels

E(level)	J^π[†]	L	C^2S[‡]	Comments
0 *4*	5^+	2	0.73 *21*	C^2S/C^2S(g.s.)=1.
230 *4*	0^+	2	0.09 *3*	C^2S/C^2S(g.s.)=0.12 (2015Sr03), 0.15 (1973Kr08), 0.14 (1976Sh17), 0.14 (1973Be27), and 0.15 (1968Nu01).
420 *4*	3^+	2(+0)	0.32 *7*	C^2S: for L=2; 0.07 *3* for L=0 (see comment on L-transfer). C^2S/C^2S(g.s.)=0.44 (2015Sr03), and 0.05 (1976Sh17) for L=2. C^2S/C^2S(g.s.)=0.09 (2015Sr03), 0.18 (1973Kr08), 0.15 (1976Sh17), 0.12 (1972Be07), and 0.12 (1968Nu01) and for L=0. L: experimental angular distribution and DWBA calculations are in better agreement for L=2 transfer; the deduced spectroscopic factor assumes neutron pickup from the $0d_{5/2}$ single-particle orbital. A value of C^2S=0.07 *3* is obtained for the 420-keV state for an L=0 transfer assuming pickup from the $1s_{1/2}$ orbital; experimental angular distributions and DWBA calculations yield poorer agreement for this scenario.
1056 *4*	1^+	2	0.17 *5*	C^2S/C^2S(g.s.)=0.24 (2015Sr03), 0.24 (1973Kr08), 0.31 (1976Sh17), 0.31 (1973Be27), and 0.29 (1968Nu01).
1762 *6*	2^+	2	0.038 *6*	C^2S/C^2S(g.s.)=0.05 (2015Sr03), 0.07 (1973Kr08), 0.02 (1976Sh17), and 0.02 (1973Be27).
1848 *8*	1^+	2	0.019 *4*	C^2S/C^2S(g.s.)=0.03 (2015Sr03), 0.05 (1973Kr08), 0.016 (1976Sh17), and 0.02 (1973Be27).
2070 *4*		2	0.26 *6*	C^2S/C^2S(g.s.)=0.35 (2015Sr03), 0.50 (1973Be27), and 0.52 (1976Sh17). E(level),L: For triplet.
2365 *4*	3^+	2	0.13 *2*	C^2S/C^2S(g.s.)=0.18 (2015Sr03), 0.28 (1973Kr08), 0.23 (1976Sh17), and 0.26 (1973Be27).
2542 *4*	3^+	2	0.16 *3*	C^2S/C^2S(g.s.)=0.22 (2015Sr03), 0.28 (1973Kr08), 0.30 (1976Sh17), and 0.30 (1973Be27).
3160 *5*	2^+	2	0.06 *1*	C^2S/C^2S(g.s.)=0.08 (2015Sr03), 0.12 (1973Kr08), 0.10 (1976Sh17), and 0.10 (1973Be27).
3409 *8*	5^+	2	0.06 *1*	C^2S/C^2S(g.s.)=0.09 (2015Sr03), 0.19 (1973Kr08), 0.09 (1976Sh17), and 0.08 (1973Be27).
3505 *5*	6^+	4	0.06 *3*	C^2S/C^2S(g.s.)=0.08 (2015Sr03), and 0.04 (1976Sh17).
4443 *6*	2^-	1	0.23 *4*	C^2S/C^2S(g.s.)=0.32 (2015Sr03), 0.02 (1976Sh17), and 0.02 (1973Be27).
4719 *4*	(4^+)	2	0.27 *8*	C^2S/C^2S(g.s.)=0.37 (2015Sr03), 1.00 (1973Kr08), 0.71 (1976Sh17), and 0.86 (1973Be27).

[†] From Adopted Levels.

[‡] The spectroscopic factors for different excited states of ^{26}Al relative to that of its ground state, C^2S/C^2S(g.s.) where C^2S(g.s.)=0.73, are also presented and compared to previous works.