## $^{23}$Na(d,p) 1963Da06

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | M. Shamsuzzoha Basunia, Anagha Chakraborty | NDS 186, 2 (2022) | 31-Mar-2022 |

$J^{\pi}(^{23}Na)=3/2^{+}$.

Others: 1998ToZU, 1979Os11, 1975Bl09, 1962Da11 (thesis of 1963Da06).

1963Da06: The $^{23}$Na(d,p) reaction was used to populate the levels of $^{24}$Na up to about 7 MeV. The targets were made by evaporation of NaOH on a gold leaf backing of about 0.2 $\mu$g/cm$^2$ thickness. The amount of Na on various targets was between 8 and 140 $\mu$g/cm$^2$. Measured angular distribution of the emitted protons from 10° to 50° in steps of 5° and thereafter up to 90° in steps of 10°, performed DWBA analysis, deduced L, spectroscopic factor. Energy resolution was about 20 keV.

### $^{24}$Na Levels

| E(level)[†] | L[#] | (2J+1)S[#] | Comments |
|---|---|---|---|
| 0 | 2 | 2.7 | |
| 470 *20* | 2(+0) | 1.6,(0.06) | |
| 560 *20* | 0(+2) | 0.40,(1.2) | |
| 1340[‡] *20* | 0(+2) | 2.5,(1.5) | |
| 1840 *20* | 0(+2) | 0.8,(1.6) | |
| 1880 *20* | 2 | 1.2 | |
| 2510 *20* | (2+4) | (0.3),(1) | |
| 2560 *20* | 2(+4) | 0.27,(1) | |
| 2990 *20* | 2 | 1.7 | |
| 3220 *20* | (4) | (1.8) | |
| 3370 *20* | 1(+3) | 1.1,(3.4) | |
| 3410 *20* | 0(+2) | 0.88,(1.0) | |
| 3580 *20* | 0(+2) | 0.11,(0.4) | |
| 3620 *20* | 2 | 1.1 | |
| 3650 *20* | 2 | 0.52 | |
| 3740 *20* | 3 | 4.1 | |
| 3880[‡] *20* | 1+3 | 0.03,0.6 | |
| 3930 *20* | 1+3 | 0.20,1.2 | |
| 3960 *20* | 1+3 | 0.06,1.2 | |
| 4140 *20* | 1+3 | 0.03,0.35 | |
| 4160 *20* | 0(+2) | 0.03,0.2 | E(level): This level was not adopted in 1978En02 and 1990En08. The No details were available. Not adopted as of the earlier ones. |
| 4180 *20* | 1+3 | 0.11,1.2 | |
| 4200 *20* | 1+3 | 0.27,0.96 | |
| 4440 *20* | 1+3 | 0.10,0.30 | |
| 4530 *20* | 1+3 | 0.14,0.68 | |
| 4560 *20* | 1+3 | 0.06,0.72 | |
| 4620 *20* | 1+3 | 0.03,0.08 | |
| 4690 *20* | 1+3 | 0.06,0.48 | |
| 4750 *20* | 1+3 | 0.27,0.56 | |
| 4940 *20* | 1+3 | 0.06,0.44 | |
| 4970 *20* | 1+3 | 0.03,0.40 | |
| 5040 *20* | 1+3 | 0.06,0.22 | |
| 5060 *20* | 1+3 | 0.16,0.64 | |
| 5120 *20* | 1+3 | 0.14,1.5 | |
| 5180[‡] *20* | 1+3 | 0.14,2.4 | |
| 5240 *20* | 1+3 | 0.14,0.32 | |
| 5330 *20* | 1+3 | 0.11,0.44 | |
| 5400 *20* | 1+3 | 0.03,0.16 | |
| 5470 *20* | 1+3 | 0.06,0.30 | |
| 5570 *20* | | | |
| 5620 *20* | | | |
| 5660 *20* | | | |

Continued on next page (footnotes at end of table)

## $^{23}$Na(d,p) 1963Da06 (continued)

### $^{24}$Na Levels (continued)

| E(level)† | E(level)† | E(level)† | E(level)† |
|---|---|---|---|
| 5720 *20* | 6060 *20* | 6490 *20* | 6730 *20* |
| 5760 *20* | 6170 *20* | 6550 *20* | 6810 *20* |
| 5830 *20* | 6220 *20* | 6580 *20* | 6880 *20* |
| 5890 *20* | 6280 *20* | 6690 *20* | |

† From 1974Ke12 for the levels up to 4.2 MeV, from 1963Da06 for the levels at 4.4 MeV and above, except as noted. 1975Bl09 report several states (or group of unresolved states) between 6.9 and 7.9 MeV.

‡ Overlaps with more than two levels in adopted dataset. Not cross referenced (XREF) in adopted dataset.

# From 1963Da06.