## $^{41}$K(d,p),(d,p$\gamma$) 1985Kr06,1978Li27

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Jun Chen[#] and Balraj Singh | NDS 135, 1 (2016) | 31-May-2016 |

Target $^{41}$K $J^{\pi}=3/2^{+}$.

1985Kr06: (d,p) E=20 MeV deuteron beam was produced from the TU Munchen Tandem Accelerator with intensity of 1.5 $\mu$A. Target of a 30 $\mu$g/cm$^2$ 95.8% enriched KF evaporated onto a 3.3 $\mu$g/cm$^2$ carbon backing. Protons were momentum analyzed with a Q3D magnetic spectrometer and detected by a proportional counter in the focal plane, FWHM=4.5-5.5 keV. Measured $\sigma$(E$_p$,$\theta$). Deduced levels.

1978Li27: (d,p) E=10 MeV deuteron beam was produced from a tandem Van de Graaff accelerator. A 60 $\mu$g/cm$^2$ thickness target of KI (98% enriched in $^{41}$K) evaporated onto a carbon backing. Protons were momentum analyzed with a broad-range magnetic spectrograph and detected in a nuclear emulsion, FWHM=35 keV. Measured $\sigma$(E$_p$,$\theta$). Deduced levels, $J^{\pi}$, L, spectroscopic factors from DWBA analysis.

1972Sp04: (d,p$\gamma$) E=6 MeV deuteron beam was produced from the University of Iowa Van de Graaff accelerator. A 800 $\mu$g/cm$^2$ target of KCl (95% enrichment in $^{41}$K) evaporated onto a 400 $\mu$g/cm$^2$ gold backing. $\gamma$-rays were detected with NaI(Tl) crystals. Measured (151$\gamma$)(107$\gamma$)($\theta$). Limits on mixing ratios deduced for 107$\gamma$ and 151$\gamma$.

1970Fr10: (d,p$\gamma$) E=3.5, 3.7 MeV. 1 mg/cm$^2$ KI target. Ge(Li) detector. Measured E$\gamma$, p$\gamma$-coin.

1969Ly02: (d,p) E=12 MeV beam from the Heidelberg tandem. Target of $KNO_3$ on a carbon backing. A broad-range magnetic spectrograph. Measured $\sigma$(E$_p$,$\theta$). Deduced levels, $J^{\pi}$, L and spectroscopic factors from DWBA analysis. The authors report 8 groups up to 1260 keV.

1958MoZZ: E=6 MeV. Measured proton spectra.

1950Sa03: E=3.90 MeV deuteron was produced from the Yale cyclotron. Natural potassium target (93.3% $^{39}$K, 0.01% $^{40}$K, and 6.7% $^{41}$K). Protons were detected by a proportional counter. Measured proton yields. Deduced levels.

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Cross section data from 1978Li27

| Level | d$\sigma$/d$\Omega$ (max) (mb/sr) |
|---|---|
| 0 | 0.71 |
| 107 | 0.82 |
| 256 | 0.80 |
| 632 | 0.28 |
| 693 | 1.91 |
| 780 | 0.91 |
| 840 | 0.04 (from 1969Ly02 only) |
| 1249 | 1.72 |
| 1371 | 0.57 |
| 1848 | 3.28 |
| 1926 | 2.32 |
| 2057 | 1.40 |
| 2223 | 0.87 |
| 2354 | 3.93 |
| 2390 | 4.80 |
| 2465 | 2.64 |
| 2544 | 0.61 |
| 2632 | 4.07 |
| 2710 | |
| 2749 | |
| 2900 | |
| 2916 | 2.22 |
| 3004 | 0.42 |
| 3193 | 0.72 |
| 3271 | 2.16 |
| 3355 | 0.33 |
| 3402 | 2.29 |
| 3635 | 0.97 |
| 3766 | 0.14 |
| 3873 | 0.59 |
| 3919 | 0.21 |

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          4002           1.89
          4039           1.08
          4117           3.41
          4407           3.01
          4466           1.36
          4560           3.10
          4791           1.60
          4839           1.39
            Uncertainty in level energy=15 keV
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## $^{42}$K Levels

| E(level)[†] | L[‡] | (2J+1)C$^2$S[‡] | Comments |
|---|---|---|---|
| 0 | 3 | 3.0 | (2J+1)C$^2$S: 1.7 (1969Ly02). |
| 106.77 *22* | 1+3 | 0.16,2.7 | L: 90% L=3, 10% L=1.<br>(2J+1)C$^2$S: 0.12, 1.5 (1969Ly02).<br>J$^\pi$: 2,3 deduced from (151$\gamma$)(107$\gamma$)($\theta$) (1972Sp04). |
| 258.27 *16* | 3 | 3.3 | (2J+1)C$^2$S: 1.9 (1969Ly02).<br>J$^\pi$: 3,4 deduced from (151$\gamma$)(107$\gamma$)($\theta$) (1972Sp04). |
| 638.6 *5* | 1+3 | 0.1,0.2 | (2J+1)C$^2$S: 0.02, 0.18 (1969Ly02). |
| 682.0 *4* | | | |
| 699.12 *15* | 3 | 8.1 | L,(2J+1)C$^2$S: for 693 group in 1978Li27.<br>(2J+1)C$^2$S: 4.26 (1969Ly02). |
| 783.77 *17* | 1[#] | 0.09[#] | |
| 841.7 *4* | 1[#] | 0.02[#] | |
| 1111.0 *11* | | | |
| 1144.0 *3* | | | |
| 1198.3 *3* | 3[&] | | |
| 1254.71 *17* | 1 | 0.51 | L,(2J+1)C$^2$S: for 1249 group in 1978Li27. Also L=1 quoted by 1982Ba55 from a priv comm from Summers-Gill (at McMaster).<br>(2J+1)C$^2$S: 0.4 for 1260 group (1969Ly02). |
| 1266.18 *18* | 1[&] | | |
| 1377.7 *4* | 1 | 0.20 | L,(2J+1)C$^2$S: for 1371 group in 1978Li27. |
| 1399.0 *9* | | | |
| 1407.7 *9* | | | |
| 1452.0 *3* | | | |
| 1463.1 *3* | | | |
| 1489.4 *3* | | | |
| 1513.19 *20* | | | |
| 1692.1 *3* | | | |
| 1723.7 *5* | | | |
| 1745.9 *6* | | | |
| 1787? *12* | | | E(level): 1776 (1958MoZZ) adjusted to 1787 by 1978En02. This level is considered as uncertain (evaluators) since it is not reported in any other study. |
| 1843.6 *3* | | | |
| 1861.89 *16* | 1 | 0.90 | L,(2J+1)C$^2$S: for 1848 group in 1978Li27. |
| 1913.7 *4* | | | |
| 1937.43 *16* | 1 | 0.77 | L,(2J+1)C$^2$S: for 1926 group in 1978Li27. |
| 1988.14 *19* | | | |
| 2052.0 *7* | | | |
| 2071.92 *15* | 1 | 0.38 | L,(2J+1)C$^2$S: for 2057 group in 1978Li27. |
| 2160.7 *7* | | | |
| 2186.3 *7* | | | |
| 2205.0 *4* | | | |
| 2238.60 *24* | 1 | 0.22 | L,(2J+1)C$^2$S: for 2223 group in 1978Li27. |
| 2250.9 *16* | | | |
| 2366.18 *16* | 1 | 1.1 | L,(2J+1)C$^2$S: for 2354 group in 1978Li27. |
| 2388.8 *3* | | | |

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## $^{41}$K(d,p),(d,pγ) 1985Kr06,1978Li27 (continued)

### $^{42}$K Levels (continued)

| E(level)[†] | L[‡] | (2J+1)C$^2$S[‡] | Comments |
|---|---|---|---|
| 2401.78 *16* | 1 | 1.3 | L,(2J+1)C$^2$S: for 2390 group in 1978Li27. |
| 2422.13 *19* | | | |
| 2455.4? *6* | | | |
| 2482.15 *14* | 1 | 0.68 | L,(2J+1)C$^2$S: for 2465 group in 1978Li27. |
| 2553.65 *23* | 1 | 0.15 | L,(2J+1)C$^2$S: for 2544 group in 1978Li27. |
| 2573.8 *3* | | | |
| 2607.4 *3* | | | |
| 2627.67 *22* | | | |
| 2644.22 *21* | 1 | 1.0 | L,(2J+1)C$^2$S: for 2632 group in 1978Li27. |
| 2652.69 *25* | | | |
| 2718.51 *20* | | | |
| 2765.74 *18* | | | |
| 2917.0 *4* | | | |
| 2923.6 *11* | 1 | 0.54 | L,(2J+1)C$^2$S: for 2916 group in 1978Li27. |
| 2938.3 *3* | | | |
| 3014.2 *3* | 1[@] | 0.82[@] | |
| 3021.16 *20* | 1[@] | 0.82[@] | |
| 3040.4 *5* | | | |
| 3193.9 *4* | | | |
| 3211.6 *3* | 1 | 0.17 | L,(2J+1)C$^2$S: for 3193 group in 1978Li27. |
| 3284.4 *5* | 1 | 0.50 | L,(2J+1)C$^2$S: for 3271 group in 1978Li27. |
| 3304.1 *6* | | | |
| 3368.7 *5* | | | |
| 3418.34 *24* | 1+3 | 0.50,0.32 | L: 80% L=1, 20% L=3.<br>L,(2J+1)C$^2$S: for 3402 group in 1978Li27. |
| 3505.3 *4* | | | |
| 3527.9 *4* | | | |
| 3620.4 *3* | | | |
| 3658.91 *23* | | | |
| 3674.3 *3* | | | |
| 3696.02 *22* | | | |
| 3875.9 *10* | | | |
| 3888.63 *22* | 1 | 0.13 | L,(2J+1)C$^2$S: for 3873 group in 1978Li27. |
| 3934.0 *5* | | | |
| 4013.2 *4* | | | |
| 4040.1 *4* | | | |
| 4054.2 *3* | 1(+3) | 0.20,0.74 | L: indication of≈50% L=3.<br>L,(2J+1)C$^2$S: for 4039 group in 1978Li27. |
| 4102.4 *4* | | | |
| 4128.47 *23* | 1+3 | 0.68,0.57 | L,(2J+1)C$^2$S: for 4117 group in 1978Li27. |
| 4153.0 *8* | | | |
| 4179.7 *3* | | | |
| 4389.5 *5* | | | |
| 4416.67 *18* | 1+3 | 0.59,0.41 | L,(2J+1)C$^2$S: for 4407 group in 1978Li27. |
| 4428.00 *21* | | | |
| 4443.3 *3* | | | |
| 4480.87 *24* | 1 | 0.28 | L,(2J+1)C$^2$S: for 4466 group in 1978Li27. |
| 4556.55 *20* | | | |
| 4576.29 *20* | 1 | 0.63 | L,(2J+1)C$^2$S: for 4560 group in 1978Li27. |
| 4590.1 *4* | | | |
| 4749.0 *4* | | | |
| 4776.7 *5* | | | |
| 4806.87 *17* | 1 | 0.32 | L,(2J+1)C$^2$S: for 4791 group in 1978Li27. |
| 4853.65 *16* | 1 | 0.27 | L,(2J+1)C$^2$S: for 4839 group in 1978Li27. |

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## $^{41}$K(d,p),(d,pγ) 1985Kr06,1978Li27 (continued)

### $^{42}$K Levels (continued)

| E(level)† | E(level)† | E(level)† | E(level)† |
|---|---|---|---|
| 4878.6 *3* | 5246.39 *19* | 5682.7 *3* | 5847.6 *4* |
| 4902.1 *4* | 5265.5? *9* | 5699.0 *3* | 5871.0? *7* |
| 4942.47 *25* | 5318.8 *4* | 5709.4 *5* | 5896.4 *4* |
| 4959.4 *5* | 5363.5 *4* | 5723.5 *6* | 5927.2 *5* |
| 4974.1? *6* | 5380.1 *15* | 5737.5 *4* | 5951.6 *13* |
| 5003.10 *24* | 5477.4 *13* | 5747.7 *8* | 5968.7 *5* |
| 5061.9 *5* | 5484.0 *6* | 5759.75 *21* | 5978.5 *4* |
| 5080.1 *4* | 5555.7 *6* | 5772.4 *6* | 6012.6 *5* |
| 5096.9 *5* | 5622.5 *3* | 5789.40 *22* | |
| 5142.9 *4* | 5629.6 *6* | 5809.3 *3* | |
| 5176.3 *11* | 5654.6 *3* | 5819.4 *3* | |

† From 1985Kr06, uncertainties are statistical only.
‡ From 1978Li27, unless otherwise stated.
# From 1969Ly02.
@ For 3014+3021. Energy of this group was 3004 group in 1978Li27.
& Quoted by 1982Ba55 (priv comm from Summers-Gill at McMaster).

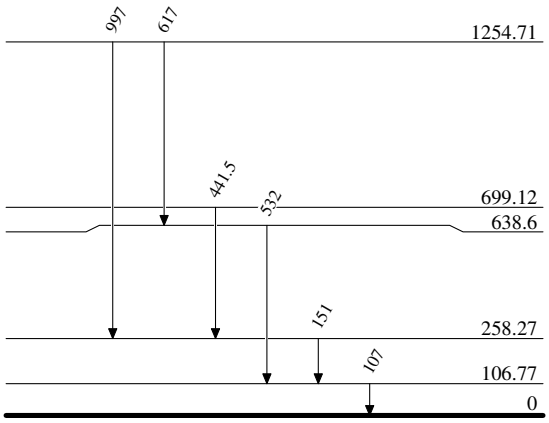
### γ($^{42}$K)

| $E_\gamma$ | $E_i$(level) | $E_f$ |
|---|---|---|
| 107‡ | 106.77 | 0 |
| 151‡ | 258.27 | 106.77 |
| 441.5† *20* | 699.12 | 258.27 |
| 532† *2* | 638.6 | 106.77 |
| 617† *2* | 1254.71 | 638.6 |
| 997† *2* | 1254.71 | 258.27 |

† From 1970Fr10.
‡ From 1972Sp04.

**$^{41}$K(d,p),(d,pγ) 1985Kr06,1978Li27**

Level Scheme




$^{42}_{19}K_{23}$