### $^{44}$Ca(d,p$\gamma$)    1988So05,1969Go04,1968Br31

| | | History | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | T. W. Burrows | NDS 109, 171 (2008) | 30-Oct-2007 |

1968Br31: E=5 MeV. Measured P's and p$\gamma$($\theta$); Si(Li)(25°), NaI. DWBA.
1969Go04: E=2.3 MeV. Measured p$\gamma$(t); semi, scin.
1988So05: E=6 MeV. Measured p$\gamma$-coincidences; Si (±45°), HPGe (90°). DSAM.
Other: see 1992Bu01.

#### $^{45}$Ca Levels

| E(level) | $J^{\pi\,\dagger}$ | $T_{1/2}{}^{\ddagger}$ | E(level) | $J^{\pi\,\dagger}$ | $T_{1/2}{}^{\ddagger}$ |
|---|---|---|---|---|---|
| 0.0[#] | 7/2$^-$ | | 2842 | 3/2$^-$ | 22 fs $6$ |
| 174 | 5/2$^-$ | 0.40[@] ns $4$ | 2976 | 5/2$^-$ | 42 fs $19$ |
| 1435[#] | 3/2$^-$ | 1.10 ps $+22-16$ | 3240 | 3/2$^-$ | 36 fs $12$ |
| 1880 | 3/2$^+$ | 0.05 ps $3$ | 3418 | 1/2$^-$ | 35 fs $7$ |
| 1900[&] | 3/2$^-$ | 1.12 ps $+11-9$ | 3783 | 1/2$^-$,3/2$^-$ | <26 fs |
| 2249 | 1/2$^-$ | 0.43 ps $+7-6$ | 3838 | (1/2)$^-$ | <15 fs |
| 2392 | 1/2$^+$ | 0.19 ps $4$ | 4616 | 1/2$^-$ | <12 fs |
| 2675 | (3/2,5/2) | | 5000 | (1/2)$^-$ | <9.7 fs |

$^\dagger$ From the Adopted Levels.
$^\ddagger$ From DSAM (1988So05), except As noted.
[#] Weakly excited (1968Br31).
[@] From p$\gamma$(t) (1969Go04).
[&] Most populated state (1968Br31).

#### $\gamma$($^{45}$Ca)

All data are from 1968Br31, except As noted. 1988So05 did not report I$\gamma$ due to possible biases from p$\gamma$($\theta$). Coincidences shown on drawing are from the p$\gamma$ spectra of 1988So05.

| $E_i$(level) | $J^{\pi}_i$ | $E_\gamma{}^{\dagger}$ | $I_\gamma{}^{\ddagger}$ | $E_f$ | $J^{\pi}_f$ | Mult. | $\delta^{\#}$ |
|---|---|---|---|---|---|---|---|
| 174 | 5/2$^-$ | 174 | | 0.0 | 7/2$^-$ | | |
| 1435 | 3/2$^-$ | 1261 | 70 $8$ | 174 | 5/2$^-$ | | |
| | | 1435 | 30 $8$ | 0.0 | 7/2$^-$ | | |
| 1880 | 3/2$^+$ | 1706 | | 174 | 5/2$^-$ | | |
| 1900 | 3/2$^-$ | 465 | 12 $6$ | 1435 | 3/2$^-$ | | |
| | | 1726 | 68 $10$ | 174 | 5/2$^-$ | M1+E2 | +0.38 $6$ |
| | | 1900 | 20 $9$ | 0.0 | 7/2$^-$ | | |
| 2249 | 1/2$^-$ | 349 | | 1900 | 3/2$^-$ | | |
| | | 814 | | 1435 | 3/2$^-$ | | |
| | | 2075 | | 174 | 5/2$^-$ | | |
| 2392 | 1/2$^+$ | 492 | | 1900 | 3/2$^-$ | | |
| | | 957 | | 1435 | 3/2$^-$ | | |
| 2675 | (3/2,5/2) | 2675 | | 0.0 | 7/2$^-$ | | |
| 2842 | 3/2$^-$ | 2668 | | 174 | 5/2$^-$ | | |
| | | 2842 | | 0.0 | 7/2$^-$ | | |
| 2976 | 5/2$^-$ | 2802 | | 174 | 5/2$^-$ | | |
| 3240 | 3/2$^-$ | 566 | | 2675 | (3/2,5/2) | | |
| | | 992 | | 2249 | 1/2$^-$ | | |

$^{44}$Ca(d,p$\gamma$)      **1988So05,1969Go04,1968Br31 (continued)**

$\gamma$($^{45}$Ca) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$† | $E_f$ | $J_f^\pi$ | $E_i$(level) | $J_i^\pi$ | $E_\gamma$† | $E_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|---|---|---|---|
| 3240 | 3/2⁻ | 3066 | 174 | 5/2⁻ | 3838 | (1/2)⁻ | 2403 | 1435 | 3/2⁻ |
| | | 3241 | 0.0 | 7/2⁻ | 4616 | 1/2⁻ | 2223 | 2392 | 1/2⁺ |
| 3418 | 1/2⁻ | 576 | 2842 | 3/2⁻ | | | 2716 | 1900 | 3/2⁻ |
| | | 1169 | 2249 | 1/2⁻ | | | 3181 | 1435 | 3/2⁻ |
| | | 1984 | 1435 | 3/2⁻ | 5000 | (1/2)⁻ | 2608 | 2392 | 1/2⁺ |
| | | 3244 | 174 | 5/2⁻ | | | 3100 | 1900 | 3/2⁻ |
| 3783 | 1/2⁻,3/2⁻ | 3609 | 174 | 5/2⁻ | | | 3565 | 1435 | 3/2⁻ |
| 3838 | (1/2)⁻ | 1938 | 1900 | 3/2⁻ | | | | | |

† From 1988So05.
‡ % photon branching from each level. 1968Br31 gave I$\gamma$(1260$\gamma$)=70 *15* and I$\gamma$(1430$\gamma$)=30 *8* and I$\gamma$(470$\gamma$)=12 *6*, I$\gamma$(1730$\gamma$)=68 *15*, and I$\gamma$(1900$\gamma$)=20 *10*. $\Delta$I$\gamma$ has been adjusted by the evaluator.
\# Alternate solution of +7 *3* excluded by CP(pol n,$\gamma$).

$^{44}$Ca(d,pγ)    **1988So05,1969Go04,1968Br31**

Legend

### Level Scheme

Intensities: % photon branching from each level

●    Coincidence
○    Coincidence (Uncertain)

| Level | $J^\pi$ | Energy | Half-life |
|---|---|---|---|
| $(1/2)^-$ | | 5000 | <9.7 fs |
| $1/2^-$ | | 4616 | <12 fs |
| $(1/2)^-$ | | 3838 | <15 fs |
| $1/2^-,3/2^-$ | | 3783 | <26 fs |
| $1/2^-$ | | 3418 | 35 fs 7 |
| $3/2^-$ | | 3240 | 36 fs 12 |
| $5/2^-$ | | 2976 | 42 fs 19 |
| $3/2^-$ | | 2842 | 22 fs 6 |
| $(3/2,5/2)$ | | 2675 | |
| $1/2^+$ | | 2392 | 0.19 ps 4 |
| $1/2^-$ | | 2249 | 0.43 ps +7−6 |
| $3/2^-$ | | 1900 | 1.12 ps +11−9 |
| $3/2^+$ | | 1880 | 0.05 ps 3 |
| $3/2^-$ | | 1435 | 1.10 ps +22−16 |
| $5/2^-$ | | 174 | 0.40 ns 4 |
| $7/2^-$ | | 0.0 | |

Transition energies (labels on arrows): 3565, 3100, 2608, 3181, 2716, 2223, 2403, 1938, 3609, 3244, 1984, 1169, 576, 3241, 3066, 992, 566, 2802, 2842, 2668, 2675, 957, 492, 2075, 814, 349, 1900 20, 1726 M1+E2 68, 465 12, 1706, 1435 30, 1261 70, 174

$^{45}_{20}$Ca$_{25}$