

⁴⁰Ca(n,n):resonances [1972Ne04,1974Si26](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja, E. A. Mccutchan		NDS 133, 1 (2016)	30-Sep-2015

See compilation by [2006MuZX](#) for full details on the neutron resonances.

[1972Ne04](#) (also [1970Ki14](#)): E(n) for resonances < 2 MeV from Karlsruhe Isochronous Cyclotron. Measured resonances, total cross sections and parameters with TOF spectrometer with neutron detectors (FWHM=0.5 keV at 500 keV to 2.5 keV at 1500 keV). R-matrix analysis.

[1974Si26](#): E(n) for resonances <550 keV. Measured cross sections and resonance parameters. R-matrix analysis.

Others:

[1993Ab03](#): E(n)= 4-20 MeV. Measured level density and cross sections.

[1990Ru11](#): E(n)< 3 MeV. Measured resonance integral.

[1976Mu05](#): E(n)= 2.5-300 keV. Measured cross section and deduced resonance parameters.

[1961Wi02](#): E(n)< 600 keV. 12 resonances reported between 88 and 595 keV.

[1962Bo04](#), [1961Bi06](#): measured neutron resonances.

Reduced neutron width (θ^2) (1972Ne04)					
Level	$\theta^2 \times 1000$	Level	$\theta^2 \times 1000$	Level	$\theta^2 \times 1000$
8449	0.10	9088	1.01	9357	0.25
8492	1.38	9092	0.30	9363	0.15
8504	0.10	9102	7.01	9375	0.33
8526	1.20	9109	0.10	9395	0.15
8578	2.38	9116	2.69	9399	0.15
9608	7.90	9136	0.53	9419	0.30
8655	0.79	9144	0.76	9430	3.05
8692	4.64	9166	1.09	9431	2.27
8714	0.49	9169	0.34	9434	1.02
8800	3.96	9173	0.95	9461	2.38
8855	3.05	9184	8.57	9464	3.32
8919	0.43	9199	2.68	9479	0.08
8939	14.10	9204	6.18	9504	0.26
8942	2.07	9210	0.22	9523	0.54
8972	1.86	9220	6.52	9530	1.40
8983	0.50	9226	0.21	9544	2.71
8986	1.77	9249	1.00	9547	0.33
8988	2.00	9265	1.46	9565	3.90
9015	1.56	9281	0.37	9576	0.49
9021	0.64	9285	3.63	9582	1.92
9043	1.40	9298	0.23	9594	1.92
9058	0.12	9309	1.45	9616	2.61
9073	0.11	9332	6.98		
9083	0.74	9342	2.16		

⁴¹Ca Levels

<u>E(level)[‡]</u>	<u>Γ_n (keV)[†]</u>	<u>L[†]</u>	<u>E(n)(lab) (keV)[†]</u>
8373	0.00065 [#]	≥1 [#]	10.827 [#] 6
8383	0.006 [#]	(0) [#]	20.404 [#] 16
8404	0.00085 [#]	(0) [#]	42.04 [#] 5
8446?	0.0034 [#]	≥1 [#]	84.80 [#] 14

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$^{40}\text{Ca}(n,n)$:resonances **1972Ne04,1974Si26** (continued) ^{41}Ca Levels (continued)

<u>E(level)[‡]</u>	<u>J^π</u>	<u>Γ_n (keV)[†]</u>	<u>L[†]</u>	<u>E(n)(lab) (keV)[†]</u>	<u>Comments</u>
8449	1/2	0.14 [#]	0 [#]	88.75 [#] 15	Γ _n (keV): Other: 0.15 keV (1972Ne04).
8451?		0.0009 [#]	≥1 [#]	90.93 [#] 15	
8461		0.017 [#]	≥1 [#]	101.0 [#] 2	
8481		0.014 [#]	≥1 [#]	121.3 [#] 2	
8491	1/2	3.2 [#]	0 [#]	131.6 [#]	Γ _n (keV): Other: 2.54 (1972Ne04).
8505		0.17 [#]	≥1 [#]	145.1 [#] 3	L: 0 and J ^π =1/2 ⁺ (1972Ne04). Γ _n (keV): Other: 0.19 keV (1972Ne04).
8510		0.023 [#]	≥1 [#]	151.0 [#] 3	
8519		0.026 [#]	≥1 [#]	160.5 [#] 4	
8527	1/2	2.44 [#]	0 [#]	168.57 [#]	Γ _n (keV): Other: 2.49 keV (1972Ne04).
8543		0.029 [#]	≥1 [#]	185.1 [#] 4	
8568		0.18 [#]	≥1 [#]	210.2 [#] 5	
8573	1/2	7.4 [#]	0 [#]	216.15 [#]	Γ _n (keV): Other: 5.65 keV (1972Ne04). E(n)(lab) (keV): 216.15 (1974Si26) and 220.0 (1972Ne04) are probably the same levels.
8586		0.30 [#]	≥1 [#]	229.1 [#] 6	
8599	1/2	20.0 [#]	0 [#]	241.80 [#]	E(n)(lab) (keV): 241.80 (1974Si26) and 250.0 (1972Ne04) are probably the same levels.
8647	1/2	1.8 [#]	0 [#]	290.95 [#]	Γ _n (keV): Other: 2.19 keV (1972Ne04). E(n)(lab) (keV): 290.95 (1974Si26) and 299.0 (1972Ne04) are probably the same levels.
8681	1/2	14.2 [#]	0 [#]	326.35 [#]	Γ _n (keV): Other: 13.65 keV (1972Ne04). E(n)(lab) (keV): 326.35 (1974Si26) and 338.0 (1972Ne04) are probably the same levels.
8709	1/2	1.61 [#]	0 [#]	354.50 [#]	Γ _n (keV): Other: 1.50 keV (1972Ne04). E(n)(lab) (keV): 354.50 (1974Si26) and 360.0 (1972Ne04) are probably the same levels.
8738		0.45 [#]	≥1 [#]	385.0 [#] 13	
8787	1/2	8.2 [#]	0 [#]	435.00 [#]	Γ _n (keV): Other: 13.38 keV (1972Ne04). E(n)(lab) (keV): 435.00 (1974Si26) and 448.0 (1972Ne04) are probably the same levels.
8817		0.45 [#]	≥1 [#]	466.3 [#] 18	
8827		0.60 [#]	≥1 [#]	476.1 [#] 18	
8852	1/2	8.1 [#]	0 [#]	501.50 [#]	Γ _n (keV): Other: 10.65 keV (1972Ne04). E(n)(lab) (keV): 501.50 (1974Si26) and 504.0 (1972Ne04) are probably the same levels.
8885		1.0 [#]	≥1 [#]	535.4 [#] 22	
8908				559.0	L: ≠ 1.
8919	3/2	0.2	1	570.0	
8939	1/2	55.0	0	591.0	
8942	5/2	<0.1	2	594.0	
8963	(3/2)		(2)	615.0	
8972	5/2	<0.1	2	624.0	
8983	1/2	2	0	636.0	
8985	5/2	<0.1	2	638.0	
8988	1/2	1.3	1	641.0	
8999				652.0	
9015	(5/2)	<0.1	2	668.0	
9021	1/2	2.7	0	675.0	
9041	1/2	0.9	1	695.0	
9058	3/2	0.1	1	713.0	

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$^{40}\text{Ca}(n,n)$:resonances **1972Ne04,1974Si26** (continued) ^{41}Ca Levels (continued)

<u>E(level)[‡]</u>	<u>J^π</u>	<u>Γ_n (keV)[†]</u>	<u>L[†]</u>	<u>E(n)(lab) (keV)[†]</u>	<u>E(level)[‡]</u>	<u>J^π</u>	<u>Γ_n (keV)[†]</u>	<u>L[†]</u>	<u>E(n)(lab) (keV)[†]</u>
9073	3/2	<0.1	1	728.0	9432	1/2	2.0	0	1095.0
9083	1/2	3.2	0	738.0	9434	5/2	0.2	2	1098.0
9088	1/2	4.4	0	743.0	9461	3/2	0.5	2	1126.0
9092	1/2	0.3	1	747.0	9464	3/2	0.7	2	1129.0
9102	(3/2)	0.6	2	758.0	9479	(3/2)		(1)	1144.0
9109	(3/2)	0.1	(1)	765.0	9495	3/2	0.2	1	1160.0
9116	1/2	12.0	0	772.0	9503	3/2	0.7	1	1169.0
9136	1/2	2.4	0	793.0	9523	1/2	3.0	0	1189.0
9143	5/2	0.1	2	800.0	9536	3/2	4.0	1	1203.0
9166	1/2	3.5	0	823.0	9544	1/2	5.0	0	1211.0
9169	(1/2)	0.4	(1)	826.0	9547	3/2	1.0	1	1214.0
9173	(5/2)	0.1	2	830.0	9565	3/2	1.0	2	1232.0
9184	3/2	0.9	2	842.0	9576	1/2	1.5	1	1243.0
9199	3/2	0.3	2	857.0	9582	5/2	0.5	2	1250.0
9204	1/2	29.0	0	862.0	9594	(3/2)	0.5	(2)	1262.0
9210	(1/2)	0.3	1	868.0	9599	(3/2)		1	1267.0
9220	1/2	31.0	0	879.0	9616	1/2	15.0	0	1284.0
9226	3/2	0.3	1	885.0	9620	(3/2)		2	1289.0
9249	1/2	1.5	1	908.0	9639			(1)	1308.0
9265	5/2	0.2	2	925.0	9649	(1/2)		(0)	1318.0
9281	1/2	0.6	1	941.0	9663				1333.0
9285	3/2	0.5	2	945.0	9667				1337.0
9298	3/2	0.4	1	959.0	9678	3/2		1	1348.0
9309	1/2	7.2	0	970.0	9685				1355.0
9322				983.0	9704	1/2		0	1375.0
9332	(3/2)	1.1	(2)	993.0	9717				1388.0
9342	1/2	11.0	0	1004.0	9736	1/2		1	1408.0
9357	(3/2)	0.5	1	1019.0	9752				1424.0
9363	(1/2)	0.3	(1)	1025.0	9761	1/2	11.0	0	1433.0
9375	1/2	0.7	1	1037.0	9773	3/2		1	1445.0
9378				1041.0	9779	3/2		1	1452.0
9383				1046.0	9795				1468.0
9393				1056.0	9805			1	1478.0
9395	1/2	0.4	(1)	1058.0	9816			(1)	1489.0
9399	1/2	0.4	(1)	1062.0	9820				1494.0
9419	3/2	0.7	(1)	1083.0	9841				1515.0
9431	(3/2)	0.6	2	1094.0	9856	5/2		2	1530.0

[†] From **1972Ne04**, unless otherwise stated.

[‡] S(n)+E(n)(c.m.). S(n)=8362.82 *I4* (**2012Wa38**). E(n)(c.m.) is deduced from E(n)(lab).

[#] From **1974Si26**. Uncertainties for Γ_n range between 10-15 % (**1974Si26**).