

^{48}Ca $Z = 20$ $N = 28$ [link to full NNDC output](#)

Based on ENSDF from Dec 2018, and mass evaluation from 2016

BE = 416.001 (0.000) MeV

Qbeta- = 0.279 (0.005) MeV

	Energy T	J+	J-	J-other	T1/2
48CA 1	0.000	0+			1 1.9E19 Y +45-8
48CA 2	3.832	2+			2 38.7 FS 19
48CA 3	4.283	0+			3 223 PS 11
48CA 4	4.503	4+			4 1.53 NS 3
48CA 5			4.507 3-		5 9.4 PS 13
48CA 6				4.612 3(+)	6 1.2 PS 4
48CA 7				4.695 1	7 32.6 FS +25-22
48CA 8				5.145 3,4,5	8 0.69 NS LT
48CA 9				5.260 4(-)	9 5.1 PS +14-8
48CA 10				5.311 2	10 232 FS +28-13
48CA 11				5.319 (1)-	11
48CA 12			5.370 3-		12 1.80 PS 14
48CA 13	5.461	0+			13
48CA 14			5.729 5-		14 0.90 PS +49-21
48CA 15				6.105 1-,2,3,4+	15 139 FS +17-28
48CA 16	6.337	2+			16 191 FS 29
48CA 17	6.345	4+			17 180 FS +35-13
48CA 18				6.480	18
48CA 19				6.612 1(-)	19 1.87 FS 14
48CA 20	6.649	4+			20 114 FS +42-28
48CA 21				6.686 2(-)	21 69 FS +56-52
48CA 22				6.792 1	22 6.9 FS LT
48CA 23	6.805	2+			23 83 FS +44-38
48CA 24				6.831 (3-)	24
48CA 25				6.895 (2-)	25 55 FS +83-55
48CA 26				6.897 (5+)	26
48CA 27			7.007 3-		27 69 FS +18-14
48CA 28				7.009 (0,1,2)	28
48CA 29				7.032 (3)-&(5)+	29
48CA 30				7.160	30
48CA 31				7.296 (2+)	31 6.9 FS LT
48CA 32				7.299 1(-)	32 0.201 FS 14
48CA 33				7.302	33
48CA 34				7.371 (LE 2)	34
48CA 35				7.402 (2-)	35
48CA 36				7.407	36
48CA 37				7.441 2,3-	37 177.4 FS 70

48CA 38		7.470	4+					38
48CA 39						7.497		39
48CA 40						7.536		40

48CA 41						7.569	LE 4	41
48CA 42					7.652	3-		42
48CA 43						7.656	1	43 1.87 FS 7
48CA 44						7.696	(1+,2+)	44
48CA 45					7.795	3-		45
48CA 46		7.800	4+					46
48CA 47					7.911	3-		47
48CA 48		7.915	2+					48 22 FS +4-3
48CA 49						7.953	(2-,6-)	49
48CA 50						7.956	(4)+	50

48CA 51						8.001		51
48CA 52		8.028	2+					52 11.4 FS 12
48CA 53						8.047	(0-,1+)	53
48CA 54					8.065	5-		54
48CA 55						8.116	1+,2+,3+	55
48CA 56						8.150	(1+,2+)	56
48CA 57		8.178	4+					57
48CA 58						8.236	4-,5-,6-	58
48CA 59		8.248	4+					59
48CA 60		8.276	4+					60

48CA 61						8.278		61
48CA 62					8.356	5-		62
48CA 63						8.385	(3-)	63
48CA 64					8.386	1-		64 0.159 FS 21
48CA 65						8.388	(6)+	65
48CA 66					8.437	3-		66
48CA 67						8.467		67
48CA 68						8.477	3+,4+,5+	68
48CA 69						8.518		69
48CA 70					8.522	3-		70

48CA 71						8.531		71
48CA 72						8.564	(6-)	72
48CA 73						8.572	(3)	73
48CA 74					8.608	3-		74
48CA 75						8.664		75
48CA 76						8.680	(3+)	76
48CA 77						8.698		77
48CA 78						8.788		78
48CA 79						8.797	4+&(6+)	79
48CA 80						8.806	(4-,5-,6-)	80

48CA 81						8.831	2-,3-,4-	81
48CA 82						8.878	(5)-	82

48CA 83		8.883	2+					83	0.42 FS	14	
48CA 84						8.890		84			
48CA 85						8.920		85			
48CA 86						8.954		86			
48CA 87						8.967		87			
48CA 88					8.982	3-		88			
48CA 89					9.034	1-		89	0.242 FS	14	
48CA 90		9.049	2+					90			

48CA 91						9.079		91			
48CA 92						9.094		92			
48CA 93						9.123		93			
48CA 94						9.130	1+,2+,3+	94			
48CA 95						9.138		95			
48CA 96						9.158	(4)+	96			
48CA 97		9.176	2+					97			
48CA 98					9.214	3-		98			
48CA 99						9.229	(7-)	99			
48CA 100						9.232	(0-,1-,2-)	100			

48CA 101					9.292	1-		101			
48CA 102						9.295	(8-)	102			
48CA 103		9.295	2+					103	0.236 FS	14	
48CA 104						9.334		104			
48CA 105						9.366	5+,6+,7+	105			
48CA 106						9.392	(1+,2+)	106			
48CA 107						9.430	2-,3-,4-	107			
48CA 108					9.473	1-		108	0.250 FS	21	
48CA 109						9.496		109			
48CA 110					9.546	1-		110	0.139 FS	7	

48CA 111						9.550	(3-)	111			
48CA 112						9.568	(5+,6+,7+)	112			
48CA 113		9.621	4+					113			
48CA 114						9.638	2-,3-,4-	114			
48CA 115						9.691	(0-,1-,2-)	115			
48CA 116						9.728	2-,3-,4-	116			
48CA 117					9.765	3-		117			
48CA 118						9.784	(3+,4+,5+)	118			
48CA 119						9.810	(1)-	119			
48CA 120					9.862	3-		120			

48CA 121						9.885	(1+,2+)	121			
48CA 122						9.894		122			
48CA 123					9.921	3-		123			
48CA 124						9.942	2-,3-,4-	124			
S-n =		9.952 (0.002)			-----						
48CA 125						9.953	(8-)	125			
48CA 126						9.954	(1+,2+)	126			
48CA 127		9.993	4+					127			

48CA 128						10.065	(4)+	128
48CA 129						10.080	(3)-	129
48CA 130		10.108		4+				130

48CA 131				10.126		1-		131
48CA 132						10.138	(1+,2+)	132
48CA 133				10.151		3-		133
48CA 134				10.182		3-		134
48CA 135				10.191		3-		135
48CA 136		10.220						136
48CA 137						10.240		137
48CA 138						10.265		138
48CA 139				10.318		3-		139
48CA 140						10.330	(1+,2+)	140

48CA 141				10.345		3-		141
48CA 142						10.354	(1+,2+)	142
48CA 143						10.370	(2)+	143
48CA 144						10.399	3+,4+,5+	144
48CA 145						10.433	1+,2+,3+	145
48CA 146				10.483		3-		146
48CA 147						10.521	(2)+	147
48CA 148						10.531	(0-,1-,2-)	148
48CA 149						10.563		149
48CA 150						10.586	(4)+	150

48CA 151				10.611		3-		151
48CA 152						10.623		152
48CA 153						10.648	(3)-	153
48CA 154				10.686		3-		154
48CA 155		10.731						155
48CA 156						10.745		156
48CA 157						10.765		157
48CA 158						10.782	(1+,2+)	158
48CA 159						10.803	(3-)	159
48CA 160				10.822		3-		160

48CA 161		10.857						161
48CA 162						10.872	5+,6+,7+	162
48CA 163						10.883	(2)+	163
48CA 164						10.916	(3)-	164
48CA 165						10.936	(1+,2+)	165
48CA 166		10.955						166
48CA 167						11.013		167
48CA 168						11.032		168
48CA 169						11.037	(2+)	169
48CA 170						11.050	(3+,4+,5+)	170

48CA 171						11.098	2+&4+	171
48CA 172						11.125	3+,4+,5+	172

48CA 173				11.153		173
48CA 174				11.183	(5-)	174
48CA 175				11.219		175
48CA 176				11.230		176
48CA 177				11.248	(4)+	177
48CA 178	11.281	2+				178
48CA 179			11.329	3-		179
48CA 180			11.376	3-		180

48CA 181				11.421	(1+,2+)	181
48CA 182				11.433	1+,2+,3+	182
48CA 183				11.447	2-,3-,4-	183
48CA 184				11.466		184
48CA 185				11.485	(2-,3-,4-)	185
48CA 186	11.508	2+				186
48CA 187			11.530	3-		187
48CA 188				11.550		188
48CA 189				11.589	0-,1-,2-	189
48CA 190				11.622	(4+)	190

48CA 191				11.639	(1+,2+,3+)	191
48CA 192				11.671	(4-,5-,6-)&(8-)	192
48CA 193			11.693	5-		193
48CA 194				11.715	(1+,2+,3+)	194
48CA 195				11.752	(2)+	195
48CA 196				11.773		196
48CA 197				11.816	2-,3-,4-	197
48CA 198				11.828		198
48CA 199				11.848		199
48CA 200			11.913	3-		200

48CA 201				11.945	(0)+	201
48CA 202				11.967	(0)+	202
48CA 203				12.009	(3-)	203
48CA 204			12.029	3-		204
48CA 205				12.051		205
48CA 206				12.090	(2-,3-,4-)	206
48CA 207				12.107	4-,5-,6-	207
48CA 208				12.123	0-,1-,2-	208
48CA 209				12.162	3+,4+,5+	209
48CA 210				12.176		210

48CA 211				12.216	4-,5-,6-	211
48CA 212				12.270	(1+,2+)	212
48CA 213				12.271	(3+,4+,5+)	213
48CA 214				12.318	(0)+	214
48CA 215				12.339	(1,2)+	215
48CA 216				12.369	(3+,4+,5+)	216
48CA 217				12.422	1+,2+,3+	217
48CA 218				12.441	2-,3-,4-	218

48CA 219				12.476		219
48CA 220				12.499	(1+,2+)	220

48CA 221				12.540	1+,2+,3+	221
48CA 222				12.565	(0)+	222
48CA 223				12.620	1+,2+,3+	223
48CA 224				12.658		224
48CA 225				12.667		225
48CA 226				12.704	(1+,2+)	226
48CA 227				12.757	1+,2+,3+	227
48CA 228				12.798	1+,2+,3+	228
48CA 229				12.846		229
48CA 230				12.869	(0+)	230

48CA 231				12.925	1+,2+,3+	231
48CA 232				12.968	(2-,3-,4-)	232
48CA 233				13.030	4-,5-,6-	233
48CA 234				13.065	(1+,2+,3+)	234
48CA 235				13.098	1+,2+,3+	235
48CA 236				13.169	0-,1-,2-	236
48CA 237				13.223		237
48CA 238				13.256	2-,3-,4-	238
48CA 239				13.290		239
48CA 240				13.360	1+,2+,3+	240

48CA 241				13.403	1+,2+,3+	241
48CA 242				13.439		242
48CA 243				13.475	1+,2+,3+	243
48CA 244				13.493		244

S-p = 15.802 (0.001)-----
S-n = 9.952 (0.002)-----
S-2p = 29.030 (0.001)-----
S-2n = 17.228 (0.002)-----
S-alpha= 13.976 (0.002)-----

S+p = -9.626 (0.003)
S+n = -5.146 (0.000)
S+2p = -21.785 (0.000)
S+2n = -11.507 (0.002)
S+alpha = -7.670 (0.007)

gap p = 6.176 (0.003)
gap n = 4.805 (0.002)
gap 2p = 7.245 (0.001)
gap 2n = 5.721 (0.003)
gap alpha = 6.306 (0.007)