^{137}Ba(γ,γ') 2004Sc39

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 108,2173 (2007)	1-Oct-2006

Nuclear Resonance Fluorescence of dipole excitation using bremstrahlung with end-point energy=4.1, 3.1, 2.5 MeV. Measured γ; $\gamma\gamma$; $\gamma\gamma(\theta)$, θ=90°, 127°, 150°; HPGE, FWHM=2 keV at 1.3 MeV, 3 keV at 3 MeV.

Others:

1978Me18: measured γ, $g\Gamma^2_{\gamma 0}/\Gamma$.

1991Ca03: E=0.5-11 MeV. Studied mechanism of photoexcitation of isomers. No evidence was found for nonresonant processes of excitation. Cross sections for resonant photoexcitation of isomers are reported.

1993Ca24: γ yield vs E for isomeric transition.

1993Ma06: σ(isomer)/σ(total) vs E and A.

1994AnZW: measured isomeric yields vs E.

1995La26: measured effective integrated σ.

^{137}Ba Levels

E(level)	J^π	$\Gamma\gamma_0$ †	$I_{S,0}$ (eV b) ‡	Comments
0.0	$3/2^+$			
283	$1/2^+$			
662	$11/2^-$			
1252	$7/2^+$	0.00362 eV *19*	8.9 *4*	B(E2)=0.147 *8*.
1294#	$5/2^+$	0.00510 eV *26*	11.7 *6*	B(M1)=0.204 *10*.
1464#		0.010 eV *4*	17 *6*	B(M1)=0.26 *9*. $I_{S,0}$ (eV b): An additional uncertainty of 30% has been added due to the overlap of this level with the 1461 background line from ^{40}K.
1481#		0.00247 eV *21*	2.60 *22*	B(M1)=0.066 *6*.
1837#		0.0039 eV *5*	2.16 *17*	B(M1)=0.054 *7*.
1892#	&	0.00185 eV *14*	1.99 *15*	B(E1)=2.6×10^{-6} *2*; B(M1)=0.024 *2*.
1899#		0.0023 eV *4*	1.26 *14*	B(M1)=0.029 *5*.
1907#		0.0047 eV *5*	3.31 *21*	B(M1)=0.058 *6*.
2041#		0.00357 eV *26*	2.17 *16*	B(M1)=0.036 *3*.
2117	&	0.00117 eV *23*	1.00 *20*	B(E1)=1.2×10^{-6} *2*; B(M1)=0.011 *2*.
2311#	&	0.00095 eV *13*	0.68 *10*	B(E1)=7×10^{-7} *1*; B(M1)=0.007 *1*.
2344@	&	0.00084 eV *18*	0.58 *12*	B(E1)=6×10^{-7} *1*; B(M1)=0.006 *1*.
2373	&	0.00130 eV *23*	0.89 *16*	B(E1)=9×10^{-7} *2*; B(M1)=0.008 *2*.
2427#	&	0.0055 eV *3*	3.60 *21*	B(E1)=3.7×10^{-6} *2*; B(M1)=0.033 *2*.
2571#	&	0.00126 eV *16*	0.73 *9*	B(E1)=7×10^{-7} *1*; B(M1)=0.006 *1*.
2653@	&	0.00077 eV *19*	0.42 *10*	B(E1)=4×10^{-7} *1*; B(M1)=0.004 *1*.
2709	&	0.00164 eV *28*	0.86 *14*	B(E1)=8×10^{-7} *1*; B(M1)=0.007 *1*.
2873		0.00150 eV *29*	0.70 *14*	B(E1)=6×10^{-7} *1*.
2905#	&	0.0123 eV *7*	5.6 *3*	B(E1)=4.8×10^{-6} *3*; B(M1)=0.043 *2*.
2954#	&	0.0053 eV *7*	1.61 *13*	B(E1)=2.0×10^{-6} *3*; B(M1)=0.018 *2*.
3037	&	0.0048 eV *5*	2.02 *20*	B(E1)=1.7×10^{-6} *2*; B(M1)=0.015 *2*.
3074	&	0.0325 eV *21*	11.2 *8*	B(E1)=1.07×10^{-5} *7*; B(M1)=0.097 *6*.
3094	&	0.0013 eV *3*	0.52 *13*	B(E1)=4×10^{-7} *1*; B(M1)=0.004 *1*.
3140	&	0.0138 eV *10*	3.5 *3*	B(E1)=4.3×10^{-6} *3*; B(M1)=0.039 *3*.
3251	&	0.0136 eV *10*	2.8 *3*	B(E1)=3.8×10^{-6} *3*; B(M1)=0.034 *3*.
3279	&	0.0022 eV *4*	0.80 *14*	B(E1)=6×10^{-7} *1*; B(M1)=0.006 *1*.

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^{137}Ba(γ,γ') 2004Sc39 (continued)

^{137}Ba Levels (continued)

E(level)	J^π	$\Gamma\gamma_0$ [†]	$I_{S,0}$ (eV b)[‡]	Comments
				E(level): alternative assignment is possible due to ambiguous decay branchings.
3332		0.0122 eV *9*	2.15 *23*	B(E1)=3.2×10^{-6} *2*.
3383	&	0.0024 eV *5*	0.82 *16*	B(E1)=6×10^{-7} *1*; B(M1)=0.006 *1*.
3453	&	0.0029 eV *5*	0.94 *17*	B(E1)=7×10^{-7} *1*; B(M1)=0.006 *1*.
3473	&	0.0026 eV *5*	0.84 *16*	B(E1)=6×10^{-7} *1*; B(M1)=0.005 *1*.
3525	&	0.0103 eV *10*	1.22 *19*	B(E1)=2.3×10^{-6} *2*; B(M1)=0.020 *2*.
3563	&	0.0077 eV *10*	1.19 *21*	B(E1)=1.6×10^{-6} *2*; B(M1)=0.015 *2*.
3640		0.0128 eV *22*	3.7 *6*	B(E1)=2.5×10^{-6} *4*.
3703		0.0105 eV *13*	0.76 *19*	B(E1)=2.0×10^{-6} *2*.
3761	&	0.123 eV *10*	34 *3*	B(E1)=2.21×10^{-5} *17*; B(M1)=0.200 *15*.
3778	&	0.0153 eV *15*	4.1 *4*	B(E1)=2.7×10^{-6} *3*; B(M1)=0.025 *3*.
3802	&	0.0107 eV *13*	2.8 *3*	B(E1)=1.9×10^{-6} *2*; B(M1)=0.017 *2*.
3822	&	0.040 eV *4*	10.6 *9*	B(E1)=6.9×10^{-6} *6*; B(M1)=0.063 *5*.
3846	&	0.0077 eV *15*	2.0 *4*	If 3279 γ-ray is transition from 3563 level, then I_γ(3846)=1; I_γ(3846)=47 *12* if 3279 γ-ray is a ground state transition. B(E1)=1.3×10^{-6} *2* and B(M1)=0.012 *2* if 3279 γ-ray is transition from 3563 level; B(E1)=2.8×10^{-6} *4* and B(M1)=0.025 *3* if 3279 γ-ray is a ground state transition. $\Gamma\gamma_0$: 0.0077 eV 15 if 3279 γ-ray is transition from 3563 level; 0.0164 *21* if 3279 γ-ray is a ground state transition.
3850	&	0.0250 eV *25*	4.0 *5*	B(E1)=4.2×10^{-6} *4*; B(M1)=0.038 *4*.
3857	&	0.048 eV *4*	12.3 *11*	B(E1)=7.9×10^{-6} *7*; B(M1)=0.072 *6*.
3894	&	0.032 eV *3*	8.0 *8*	B(E1)=5.1×10^{-6} *5*; B(M1)=0.046 *5*.
3940	&	0.0122 eV *17*	3.0 *4*	B(E1)=1.9×10^{-6} *3*; B(M1)=0.017 *3*.
3981	&	0.0088 eV *19*	2.1 *5*	B(E1)=1.3×10^{-6} *3*; B(M1)=0.012 *3*.

[†] g=(2J_f+1)/(2J_i+1), J_i=3/2$^+$ (^{137}Ba g.s.).
[‡] Integrated cross section.
[#] Level energy represents average value of data from measurements using bremsstrahlung end point energies.
[@] Level energy represents data from low-energy end point measurements only.
[&] Parity of level unknown.

$\gamma(^{137}Ba)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
1252	7/2$^+$	1252	100	0.0	3/2$^+$	2311		2311	100	0.0	3/2$^+$
1294	5/2$^+$	1294	100	0.0	3/2$^+$	2344		2344	100	0.0	3/2$^+$
1464		1464	95[†]	0.0	3/2$^+$	2373		2373	100	0.0	3/2$^+$
1481		1481	60[†]	0.0	3/2$^+$	2427		2427	100	0.0	3/2$^+$
1837		1837	49 *2*	0.0	3/2$^+$	2571		2571	100	0.0	3/2$^+$
1892		1892	100	0.0	3/2$^+$	2653		2653	100	0.0	3/2$^+$
1899		1899	51 *4*	0.0	3/2$^+$	2709		2709	100	0.0	3/2$^+$
1907		1907	67 *3*	0.0	3/2$^+$	2873		2873	100	0.0	3/2$^+$
2041		2041	66[†]	0.0	3/2$^+$	2905		2905	100	0.0	3/2$^+$
2117		2117	100	0.0	3/2$^+$	2954		2954	62 *13*	0.0	3/2$^+$

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^{137}Ba(γ,γ') 2004Sc39 (continued)

$\gamma(^{137}Ba)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
3037		3037	100	0.0	$3/2^+$	3640		3640	100	0.0	$3/2^+$
3074		3074	85 *11*	0.0	$3/2^+$	3703		3703	26 *6*	0.0	$3/2^+$
3094		3094	100	0.0	$3/2^+$	3761		3761	100	0.0	$3/2^+$
3140		3140	64 *9*	0.0	$3/2^+$	3778		3778	100	0.0	$3/2^+$
3251		3251	56 *8*	0.0	$3/2^+$	3802		3802	100	0.0	$3/2^+$
3279		3279‡	100‡	0.0	$3/2^+$	3822		3822	100	0.0	$3/2^+$
3332		3332	51 *8*	0.0	$3/2^+$	3846		3846		0.0	$3/2^+$
3383		3383	100	0.0	$3/2^+$	3850		3850	62 *13*	0.0	$3/2^+$
3453		3453	100	0.0	$3/2^+$	3857		3857	100	0.0	$3/2^+$
3473		3473	100	0.0	$3/2^+$	3894		3894	100	0.0	$3/2^+$
3525		3525	38 *7*	0.0	$3/2^+$	3940		3940	100	0.0	$3/2^+$
3563		3279‡	51‡ *13*	283	$1/2^+$	3981		3981	100	0.0	$3/2^+$

† From Adopted Levels, Gammas.
‡ Multiply placed with undivided intensity.

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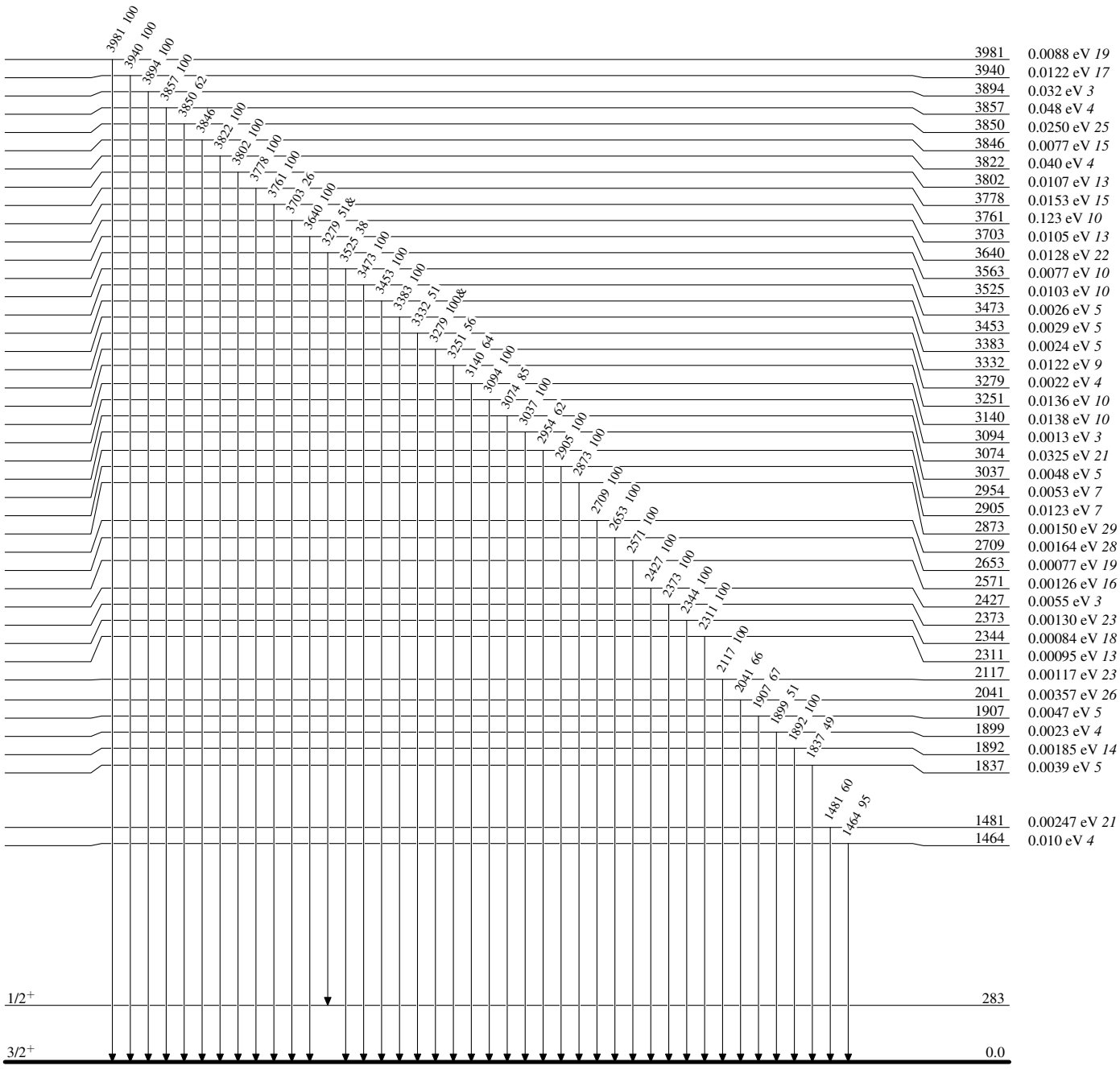
Level Scheme

Intensities: % photon branching from each level
& Multiply placed: undivided intensity given



$^{137}_{56}Ba_{81}$

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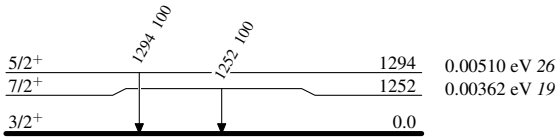
Level Scheme (continued)

Intensities: % photon branching from each level
& Multiply placed: undivided intensity given



$^{137}_{56}Ba_{81}$