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BrIcc - changes

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CC - Total conversion coefficient

Present practice:

- CC(DCC) – experimental value if it is known; "CC$" should be on G-comment record
- Calculated CC for pure multipolarities, CC(DCC) for mixed transitions; DCC also given if DCC/CC large
- For M1+E2+E0 no calculation is made to accommodate large uncertainties
- Rounding rule for CC(DCC) already has been relaxed

Problem: BrIcc could overwrite experimental CC

Proposal to put CC on G- and S_G records

```
223RA  G      29.86 1  0.59    8  M1+E2    0.41     10     5.4E2  15
223RAS G     CC=        LC=4.3E+2 140      $MC=1.1E+2 4
223RA CG CC$CC=5.4E2 13 from G-ray transition intensity balance at 29.9 level,
223RA2CG and %A=2.90 15 (1964BA33).
```

a) If *CC* < 1.0E-4 do not put *CC*(DCC) on S_G or G-record

b) If *CC*(DCC) field is non-blank and G-comment card has "*CC$*", put calculated *CC*(DCC) on S_G-record

c) If *CC*(DCC) field is blank and NO "*CC$*" on G-comment card, put calculated *CC*(DCC) on G-record; Also replace it if new value is different and (flag it)

d) If *CC*(DCC) field is blank and G-comment record has "*CC$*", put calculated *CC*(DCC) on S_G-record and give a warning (flag it)

e) For M1+E2+E0 transitions calculate *CC*(DCC) as for an M1+E2 in accordance of (a)-(d) above and give a warning (flag it)

f) Uncertainties of calculated ICC values rounded according to the new (ISO) rules. Tis rule should be used for all entries on S_G records!

NOTE: "*CC$*" and "*CC *"

BUT: "*ECC$*" or "*ECC *" BrIcc will replace *CC* if needed

E0 Transitions in ENSDF and Ω(E0) in BrIcc

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Present status:

a) W(E0) coming from different calculations, coverage is not consistent with BrIcc

Data Table	Reference	Z	Shells or IPF	L	Transition energy [keV][a]
Internal Conversion Coefficient (ICC)					
BrIccFO	Based on the model using the *'Frozen Orbitals'* approximation of 2002Ba85 and 2002Ra45	5–110	All shells	1–5	ε_{ic}+1–6000
BrIccNH	Based on the model using the *'No Hole'* approximation of 2002Ba85 and 2002Ra45	5–110	All shells	1–5	ε_{ic}+1–6000
Pair Conversion Coefficient (PCC)					
ScPcc	1979Sc31	0–100[b]	IPF	1–3	1100–8000
HoPcc	1996Ho21	50–100	IPF	1–3	1100–8000
Electronic factor Ω(E0)[c]					
HsOmg	1969Ha61	30–42	K[d],L_1[e],L_2[f]	0	ε_{ic}+6–1500
BeOmg	1970Be87	40–102	K	0	51[f]–2555
		40–102	L_1,L_2	0	51–2555
PaOmg	1986PaZM	8–40	K[e]	0	511–12775
		8–40	IPF	0	1431–12775

b) No calculation is made for M1+E2+E0

c) TI calculated as TI(E0) = EK(E0)/0.85 and labelled as "g+ce". No single gamma is allowed for a pure E0!

New E0 electronic factors for CE

BrIccv3.1

with **Jackson Dowie**, Tomas Eriksen and Andrew Stuchbery (ANU)

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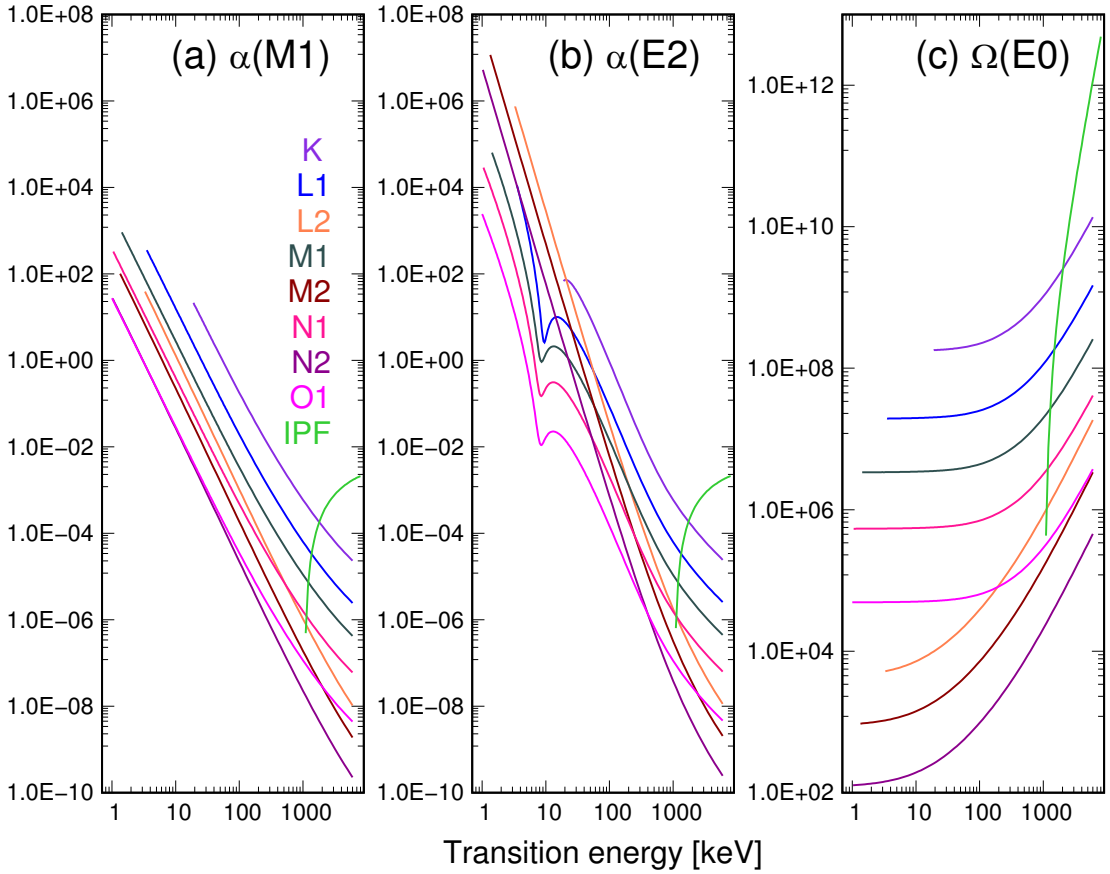
Takahe

- Modified version od CATAR (Pauli & Raff, *CPC* **9** (1975) 392
- Screening function: self-consistent Dirack-Fock-Slater, (HEX code, *CPC* **2** (1971) 107)
- Binding energy: same as in BrIcc; Z<=95 experimental, Z>95 theoretical
- Z=5 to 126
- All atomic shells; Ω(E0) significant only for *nS* and *nP* shells!
- Same energy mesh as in BrIcc (1-6000 keV)



New E0 electronic factors for IPF

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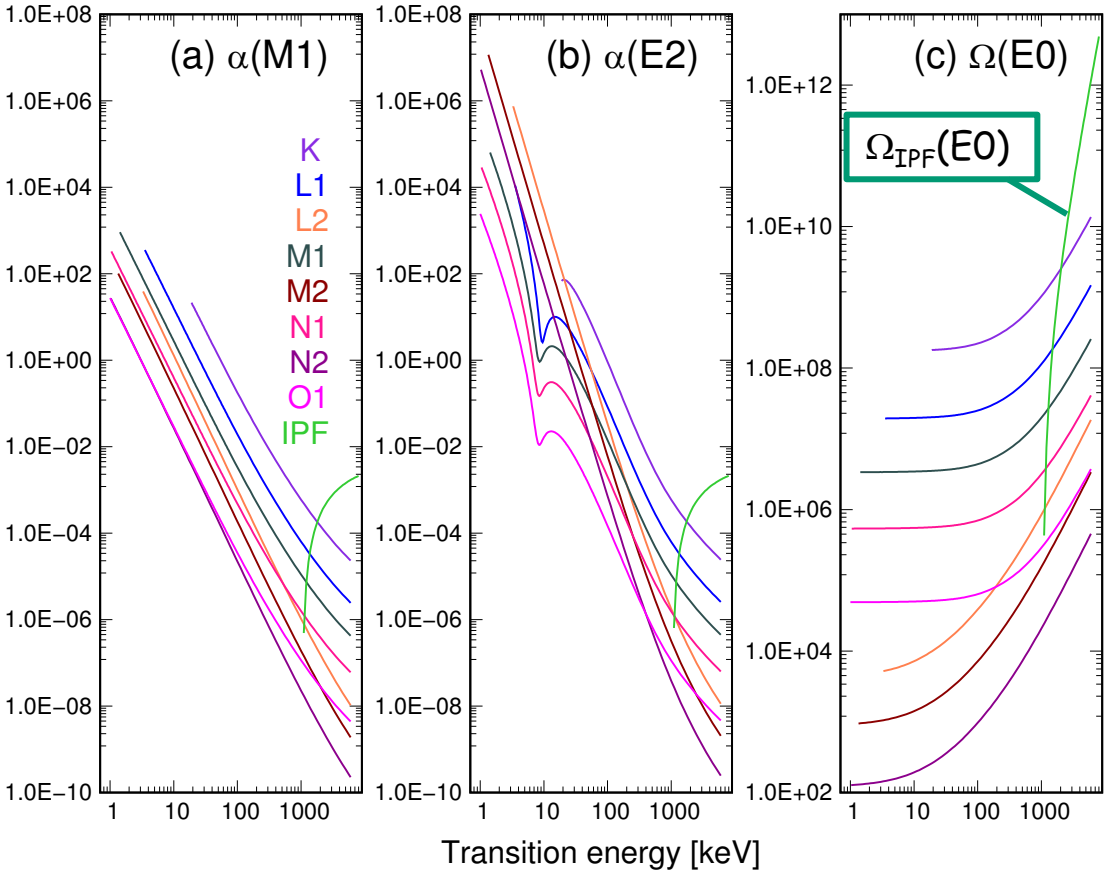
WspOmega

- Based on Wilkinson Nucl. Phys. **A133** (1969) 1
- Z=4 to 100; even Z only
- 1100 to 8000 keV
- Same energy mesh as in α_{IPF} in BrIcc



New E0 electronic factors for IPF

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WspOmega

Nucleus	Transition Energy [keV]	$\Omega_K(\mathrm{E0})/\Omega_{IPF}(\mathrm{E0})$ Experiment			Lombard [30]	Passoja [13]	Soff [31]	This work
^{16}O	6048.2	4.00E-5	*(46)*	[39]	3.92E-5	3.82E-5	3.8E-5	3.45E-5
^{40}Ca	3352.6	6.94E-3	*(20)*	[40]	6.0E-3	7.16E-3	7.16E-3	6.86E-3
^{42}Ca	1837.3	0.111	*(22)*	[60]	0.072	0.139	0.139	0.133
^{54}Fe	2561.3	0.053	*(14)*	[42]		0.0598		0.0575
		0.053	*(3)*	[65]		0.0598		0.0575
^{60}Ni	2284.87	0.130	*(28)*	[43]		0.135		0.135
^{64}Zn	1910	0.46	*(7)*	[44]		0.472		0.475
^{70}Ge	2307.1	0.20	*(8)*	[45]		0.212		0.207
^{90}Zr	1760.70	3.0	*11)*	[46]	1.42	2.48	2.52	2.48
		2.38	*(8)*	[40]	1.42	2.48	2.52	2.48
		2.28	*(32)*	[47]	1.42	2.48	2.52	2.48
^{140}Ce	1903.5	6.3		[48]	5.22		6.9	7.23
^{214}Po	1416	440-625		[49, 50]	148		388.6	414

Ω(exp)/Ω(theor)

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$$R(exp/theor = 100\times \frac{\Omega(\text{exp}\quad) - \Omega(theor)}{\Omega(theor)}$$

- Searching ENSDF and primary publications 129 experimental ratios found
- 82 points with $\Delta R/R \leq 25\%$

	R(exp/theor)
All (82)	-4.6(15)
CE (75)	-5.5(17)
K/IPF (7)	-2.3(19)