SYSTEMATICS OF 5⁻ LEVELS OF EVEN-EVEN NUCLEI

THE most common mode of collective vibration of even-even nuclei is the $\lambda = 2$ quadrupole type. Of the less common ones we have $\lambda = 3$ mode giving rise to 3⁻ state and $\lambda = 5$ mode giving rise to 5⁻ level.

Recently Eichler[1] has studied 3⁻ levels of even-even nuclei and makes the interesting observation that the log *ft* value of allowed beta-transitions to these 3⁻ levels is in general larger than the average value implying hindrance.

We have carried out a similar analysis on 5⁻ levels. Table I shows our attempt. The various columns are self-explanatory. The value given in the seventh column is an average over several allowed transitions in the neighbourhood.

From Table I we conclude that there is neither enhancement nor hindrance in direct contrast to Eichler's study of 3⁻ levels.

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TABLE I

Log ft values of allowed β-transitions to 5⁻ levels of even-even nuclei

	Parent Nucleus	State and Parity	Daughter Nucleus	Type of decay	Energy of 5⁻ level in Mev.	Log *ft*	Log *ft* (Average)	Ref.
	1	2	3	4	5	6	7	8
1	$_{39}Y_{47}^{86}$	4⁻	$_{38}Sr_{48}^{86}$	β^+	2·58	5·9	6·2	1
2	$_{47}Ag_{63}^{110}$	6⁻	$_{48}Cd_{62}^{110}$	β^-	2·93	5·4	4·9	2
3	$_{63}Eu_{83}^{146}$	(4⁻)	$_{62}Sm_{84}^{146}$	β^+	2·05 (*a*)	7·8	8·8	3
4	$_{63}Eu_{85}^{148}$	(4⁻)	$_{62}Sm_{86}^{148}$	ϵ	1·6	9·0	8·8	4
5	$_{67}Ho_{95}^{162}$	(6⁻)	$_{66}Dy_{96}^{162}$	ϵ	1·49	4·6	4·7	5
6	$_{85}At_{125}^{210}$	(6⁻, 5⁻, 4⁻)	$_{84}Po_{126}^{210}$	ϵ	2·92	5·9	6·0 (*b*)	6

(*a*) Parity is most probably odd; (*b*) As there are no allowed transitions in this neighbourhood and since the average log *ft* value for first forbidden transitions is about 6·5, we have taken an average of 6·0 for an allowed transition.

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