LETTERS TO THE EDITOR

L-FORBIDDEN TRANSITIONS NEAR DEFORMED REGION

RECENT work of Berlovich *et al.*[1] has pointed to the rather interesting connection between the *l*-forbidden selection rule for M_1 transitions imposed by the shell model and the approach towards nuclear deformation. This conclusion was reached by Berlovich *et al.* on the basis of just three examples.

The availability of compilation of more complete data on l-forbidden M_1 transitions has prompted us to examine this trend in more detail.

Table I gives an analysis of the available data. The various columns are self-explanatory. Included in the analysis are the recent data of Berlovich *et al.*[1] Unfortunately, since the mixing ratio for those transitions was not given it was not possible to compute the E_2 enhancements. Qualitatively, one should expect a correlation between the E_2 enhancements and the approach to nuclear deformation. The last column lists the surface tension parameters C computed using the weak coupling model of Bohr[2] and the computed E_2 enhancements. In this theory the enhancement is related to the surface tension parameter according to the relation,

$$\frac{e_{eff}}{e} = 1 + \frac{5Zk}{4\pi C}$$

where k = constant (= 40 Mev.)
Z = atomic number.

From an examination of Table I we note that as the neutron number approaches 90, which characterizes the onset of nuclear deformation, the M_1 retardation factors decrease. The trend in the E_2 enhancement and hence the surface tension parameter C cannot be discussed due to lack of data on M_1–E_2 mixing ratios.

Department of Physics, S. M. BRAHMAVAR.
Karnatak University, M. K. RAMASWAMY.
Dharwar, *December* 24, 1962.

1. Berlovich, E. Ye, *et al.*, *Nuclear Physics*, **1962**, **37**, 469
2. Bohr A. and Mottelson, B. R., *Kgl. Danske Sel kab Mat. Fys. Medd.*, 1953, **27**.

TABLE I

No.	Nucleus	Energy of γ-Transition Mev.	$\delta^2 = (E_2/M_1)^2$	Conversion coefft. α	τ = lifetime (Expt.) Sec.	M_1-retardation factor	E_2-enhancement	Surface-tension parameter C
1	$_{52}Te^{121}$	0·213	0·058	0·09	$<5 \times 10^{-9}$	>225	>0·37	..
2	$_{55}Cs^{133}$	0·081	0·026	1·82	6×10^{-9}	370	6	600
3	$_{52}Te^{123}$	0·159	0·012	0·19	$1·9 \times 10^{-10}$	37	8	450
4	$_{59}Pr_{82}^{141}$	0·145	0·006	0·41	$1·9 \times 10^{-9}$	330	0·44	..
5	$_{61}Pm_{86}^{147}$	0·091	0·062	1·84	$2·4 \times 10^{-9}$	220	17	290
6	$_{81}Tl^{201}$	0·330	2·24	..	7×10^{-11}	380	15	425
7	$_{81}Tl^{203}$	0·279	2·25	0·18	$2·7 \times 10^{-10}$	920	10	580
8	$_{63}Eu_{84}^{147}$	0·295	..	0·195	$2·20 \times 10^{-10}$	115	..	..
9	$_{63}Eu_{86}^{149}$	0·150	..	0·63	$5·20 \times 10^{-10}$	78	..	..
10	$_{63}Eu_{88}^{151}$	0·217	..	29·1	$1·02 \times 10^{-7}$	47	..	..