LETTERS TO THE EDITOR

NOTE ON 5⁻ LEVELS IN EVEN-EVEN NUCLEI

3⁻ LEVELS of even-even nuclei have been recently interpreted as due to octupole vibrations of the even-even core. It is the purpose of this note to examine the available data on the 5⁻ levels of even-even nuclei and to see if one can interpret them in terms of a $\lambda = 5$ collective vibration.

In Table I are collected the known nuclei which exhibit 5⁻ excited states over the mass number range 90–210.

TABLE I

5⁻ levels of even-even nuclei

Nucleus	Level (Mev.)
Zr- 90	2·32
Cd-108	(2·54)
Cd-110	2·92
Sn-118	2·29
Sn-120	2·29
Xe-130	2·34
W-182	1·62
Pb-206	2·8
Pb-202	2·04
Pb-208	3·2, 3·71
Po-210	2·91

The following remarks may be made :—

1. The excitation energy of these levels varies very little with mass number similar to the 3⁻ levels suggesting some sort of core excitation.

2. No 5⁻ level is definitively known for $A < 90$. This is consistent with a breakdown of collective motion characterized by a given number of nodes when the corresponding wavelength at the nuclear surface becomes comparable with or less than the internucleon distance.

3. If the proposed vibrational description of the 5 states is correct, excitation of these states

should be possible and in fact favourable by inelastic electron scattering, and lastly

4. It would be interesting to look for more of these states guided by the above-mentioned systematics.

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Dharwar-3, *November* 12, 1962.