EO AND EO+M1+E2 TRANSITIONS IN \(^{178}\)Hf

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Even-even deformed nuclei present a rotational band built on their ground state \(0^+\). In some of these nuclei higher energy levels are interpreted as members of a rotational band built on the \(\beta\)-vibrational level.

From the special models of \(\beta\)-vibrational levels one may foresee allowed EO transition probabilities. The EO mode is not necessarily weak. For large \(Z\) the EO emission rate may be comparable to the M1 emission rate, and considerably superior to the E2 one.

At Institut des Sciences Nucléaires in Grenoble we have determined some characteristics in the EO and EO+M1+E2 transitions in \(^{178}\)Hf.

In the two EO+M1+E2 transitions of 1163 and 1403 keV, the E2 component in the M1+E2 mixture has been determined by Hamilton et al. to be 14.4\% and 39.0\% respectively. We used these values together with our own experimental results to calculate the percentage of EO electrons in the total number of emitted electrons and to estimate the ratio between the EO and E2 electron intensities, the \(q^2\) term.

We found the two transitions to have strong \(q^2\) values, i.e. a sizeable admixture of EO electrons. This is in accordance with the theory concerning transitions going from \(\beta\)-vibrational bands, but it is not enough to definitely give a \(\beta\)-vibrational character to the 1276 and 1496 keV levels in \(^{178}\)Hf.