

AN OSCILLATOR MODEL FOR ATOMS

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Abstract:

This work gives some reasons to backup the hypothesis that considers the low energy spectrum of any quantum system as an oscillator spectrum. We obtain an expression for the cumulative number of excited states of a d dimensional oscillator as a function of the energy. We fit the low energy spectrum to the oscillator model of two parameters: the effective dimension (d) and the oscillation frequency (ω). Finally, we show the relation between the effective dimension (d) and the atomic number (z), that yields some periodicity. In this relation is important to notice that the full electronic shells elements (noble gases) have a considerably larger effective dimension than the other elements; this fact could be interpreted as a collective motion of the electronic shells.

We also recommend to study the behavior of the ionization energy with the oscillation frequency.