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# Magnetic dipole moments as a signature for α-clustering in even-even self-conjugate nuclei

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The magnetic dipole moments in even-even self-conjugate nuclei from $^{12}$C to $^{44}$Ti are investigated. For the latter, the measured gyromagnetic factors of excited states turn out to assume the same value of $g \approx +0.5$ within statistical errors. This peculiar feature can be interpreted on the basis of collective excitations of $\alpha$-clusters. Analogously, the behaviour of the same observable is studied for all isotopes obtained by adding one or two neutrons to the considered self-conjugate nuclei. It is found that for the $N = Z + 1$ isotopes the $\alpha$-cluster structure hardly contributes to the observed negative gyromagnetic factor, corroborating molecular $\alpha$-cluster models. The addition of a further neutron, however, restores the original $\alpha$-cluster g-factors, except for the semi-magic isotopes, in which the deviations from $g \approx +0.5$ can be associated with the relevant shell closures. Secondly, the same observable is analyzed in the framework of a macroscopic $\alpha$-cluster model on a finite lattice of side length $L$. In particular, discretization effects induced in the magnetic dipole moments of the $2_1^+$ and the $3_1^-$ states of $^{12}$C at different values of the lattice spacing $a$ are discussed. The context provides eventually the opportunity to probe the effectiveness of the existing approaches in reducing the artifacts introduced by a finite lattice spacing.

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