

This work discuss the theory of the magnetizability. Magnetizability is a molecular property defined as the second-order perturbation in the energy in the presence of an external magnetic field. When the magnetic field is static, perturbation and multipole theories lead to an origin-independent expression of the magnetizability, whereas for a frequency-dependent magnetic field its expression result to be origin-dependent. Since in the static case magnetizability is an observable quantity, the expression obtained in the dynamic case is clearly unphysical. My work discuss several approaches in order to solve this issue. Magnetizability has been analyzed in the microscopic case, within both the non-relativistic and the relativistic framework. The expression of the magnetizability proposed by Raab and de Lange has been considered, pointing out the weak points of their non-relativistic theory, and trying to recover an alternative expression in the relativistic framework. The macroscopic case has also been discussed in detail, and an origin-independent expression of the inverse permeability has been derived within a fully relativistic approach. The problem to find an origin-independent expression of the magnetizability in the microscopic case remain unresolved, but the results obtained in the macroscopic case and the analysis done so far are good starting points for further studies, and suggest to work in the relativistic framework.