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NV^- CENTER EMULATION IN AN EXTERNAL MAGNETIC FIELD

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An NV center is an impurity-defect complex in diamond, the electronic levels of which experience a fine splitting into spin states, which is caused by different mutual orientations of their half-integer spins. When a tetravalent carbon atom is replaced by pentavalent nitrogen, an additional electron appears in the lattice, and when a neighboring vacancy is formed, four more electrons are released. So, three valence electrons of the nitrogen atom are covalently bonded to nearby carbon atoms, two to the vacancy. Often these five electrons attached to the center are joined by a sixth electron from another nitrogen atom. Thus, the center can be either neutral or negatively charged. It should be noted that the paramagnetic ground state of a center with a strong electron spin polarization is inherent only in the NV^- form. The energy of the zero energy sublevel turns out to be less than the energies of sublevels -1 and 1 by 2.87 GHz. [1].

In total, there are 4 bonds between the vacancy and neighboring atoms (including a nitrogen one) located at an angle of 109.5° relative to each other [2]. Having the magnitude of the signal of optically detected magnetic resonance (ODMR), it is possible to reconstruct the vector of the external magnetic field, taking into account its projection angle on the bonds with the vacancy [3].

The work is devoted to emulating the correlation of a projection of magnetic field vector on axes of nitrogen-vacancy center in diamond lattice with frequencies of optically detected magnetic resonance (ODMR).

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