MICROSTRUCTURE AND INTERACTION OF OPTICAL CENTERS IN CRYSTAL $Y_2SiO_5:Pr^{3+}$

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S u m m a r y

The mechanisms of interaction between equivalent and nonequivalent optical centers in crystal $Y_2SiO_5:Pr^{3+}$, as well as the mechanisms of interaction between Pr^{3+} optical centers and the crystalline environment, have been studied. It has been demonstrated that the interaction with two-level systems makes a contribution, additional to that made by the quadratic electron-phonon interaction, to the uniform width of the resonance optical transition ${}^3H_4 \leftrightarrow {}^3P_0$ of Pr^{3+} ions. Two new mechanisms of center-to-center interaction, which are different in principle, have been revealed. The first is associated with the dipole–dipole interaction between nonequivalent Pr^{3+} optical centers, while the second is caused by the cooperative cross-relaxation of the excitation energy of term ${}^1D_2$ with the participation of Pr^{3+} optical centers of the same type.