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Dynamical Jahn-Teller effect in spin-orbital coupled system JOJI NASU, SUMIO ISHIHARA, Department of Physics, Tohoku University — Orbital degree of freedom is one of the most attractive themes in strongly correlated electron system. A coupling between the orbital and the lattice vibration is known as a Jahn-Teller effect (JTE). The dynamical aspect of the Jahn-Teller interaction is often neglected in solid, because it is strongly suppressed by the cooperative JTE. Recently, $Ba_3CuSb_2O_9$ has been reported as a candidate of the spin liquid. A Cu^{2+} has the e_g orbital degree of freedom and is surrounded by the O^{2-} octahedron. The octahedra on the neighboring sites do not have the common O ions. This fact implies that the cooperative JTE is weak, and the dynamical JTE is expected to play some key roles on orbital and magnetic properties. The purpose of this research is to study the dynamical JTE in a spin-orbital coupled system. In particular, we focus on the competitive or cooperative phenomena between the superexchange interaction and the dynamical JTE. The superexchange interactions are derived from the $d-p$ model on a honeycomb lattice. We have confirmed this interaction stabilizes the antiferro-spin and ferro-orbital configurations for the realistic parameters. The dynamical JTE described as the orbital-lattice coupling is obtained by extracting the low energy states of the vibronic Hamiltonian. We analyze the model including the two kinds of interactions by using the Bethe approximation. We find that the magnetic order is unstable in wide parameter region and the spin-dimer state with the orbital order is realized. Furthermore the orbital order is strongly suppressed by the dynamical JTE.

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