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**Study of Orbital Degenerate System in Frustrated Checkerboard Lattice** JOJI NASU, Tohoku University, SUMIO ISHIHARA — Orbital degree of freedom is one of the recent attractive themes in transition-metal oxides. In contrast to the spin degree of freedom, the orbital interaction explicitly depends on the bond direction, and a certain kind of frustration exists. In the geometrical frustrated lattice, cooperating and competing effects between the orbital frustration and the geometrical frustration provide new features in the static and dynamical properties of orbital. The present purpose is to study the intrinsic orbital frustration effect in a geometrical frustrated lattice. We introduce the spin-less Hubbard-type model with the doubly degenerate $d_{yz}$ and $d_{zx}$ orbitals in the checkerboard lattice. The effective Hamiltonian for the strong correlation limit is derived. We have the $J_z S_i^z S_j^z$ type Ising interaction for the nearest-neighbor bonds and the $J_x S_i^x S_j^x$ type Ising one for the next nearest-neighbor bonds. Here $\boldsymbol{S}$ is the orbital pseudo-spin operator. In the mean-field approximation, there is a macroscopic number of degeneracy at the frustration point $J_x/J_z$=2. In the classical Monte-Carlo simulation, we have a staggered orbital order and the reentrant phase-boundary. In the analyses by the spin-wave approximation and the exact diagonalization method, a large damping of the high-energy orbital dynamics due to the frustration is observed.

Joji Nasu
Tohoku University

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