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Magnetodielectric phenomena in charge-spin coupled system in electronic ferroelectricity MAKOTO NAKA, SUMIO ISHIHARA, Department of Physics, Tohoku University — Electronic ferroelectricity is known as phenomena where electric polarization is attributed to the charge order without inversion symmetry. This is seen in some transition metal oxides, e.g. $LuFe_2O_4$, and charge transfer salts. Quasi 2-dimesional organic salt kappa-$(ET)_2Cu_2(CN)_3$is one of the kappa-ET salts of which two ET molecules construct a dimer and are arranged on a triangular lattice. Recently, it is reported that the increase of dielectric constant is experimentally observed below 60K. This indicates the presence of ferro (or anti-ferro) electric transition. An origin of the electric polarization is thought to be generated by a localized hole in one side of ET molecules in dimers [1,2]. We present a theory of magneto-dielectric phenomena in electronic ferroelectricity, in particular for this kappa-ET salt [3].We treat the electric dipole as a pseudo spin and construct an effective model Hamiltonian with the inter-dimer transfer integrals and the Coulomb interactions on a triangular lattice. We analyze this model by utilizing mean-field approximation and classical Monte-Carlo method, and investigate magnetodielectric phenomena which originate from spin-charge coupling and geometrical frustration. [1] T. Sasaki et al. (unpublished). [2] C. Hotta. (unpublished). [3] M. Naka and S. Ishihara.

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