Effect of interaction between fractional excitations on J1-J2-J3 Ising model on a kagome lattice TOMONARI MIZOGUCHI, Department of Physics, University of Tokyo, MASAFUMI UDAGAWA, Department of Physics, Gakushuin University, LUDOVIC D. C. JAUBERT, Okinawa Institute of Science and Technology Graduate University — In quantum spin liquids (QSLs), elementary excitations are fractionalized, e.g., the spins are separated into spinons and fluctuating gauge fields. The fractional excitations reflect the nature of QSLs, and a full understanding of their character is awaited. Nevertheless, they are usually approximated as free particles, and we still have little understanding of the essential many body effects of fractional excitations. In this regard, classical spin liquids (CSLs) provide a good stage to study interacting fractional excitations, which have many in common with QSL's. For instance, in classical spin ice, interactions between monopoles give rise to their recombination and alter their dynamical properties. It is plausible to expect similar nontrivial effects will be found in other CSLs. In this presentation, we show the equilibrium properties of the J_1-J_2-J_3 Ising model on a kagome lattice, in which the farther-neighbor interactions ($\propto J_2 = J_3$) is translated into the short-range interaction between the fractional charges. We will report that the recombination of charges leads to the new CSLs. In one of the new CSLs, the magnetic structure factor shows a lq lq half-moon" pattern instead of pinch points, which may provides a clue to looking for this new CSL.

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