Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magnetic fluctuations and dynamics in the vicinity of quantum spin liquids: Cluster dynamical mean-field study of the Kitaev model JUNKI YOSHITAKE, Dept. of Appl. Phys., Univ. of Tokyo, JOJI NASU, Dept. of Phys., Tokyo Inst. Tech., YUKITOSHI MOTOME, Dept. of Appl. Phys., Univ. of Tokyo — The quantum spin liquid, which does not show any long-range ordering down to the lowest temperature, has attracted broad interest as a new quantum state of matter. Since the ground state of the Kitaev model was shown to be a quantum spin liquid in two dimensions [1], there has been an explosion in both theoretical and experimental studies. Nevertheless, dynamical properties at finite temperatures remain a challenge, despite the relevance to analysis of recent experiments for Ir and Ru compounds. In this contribution, we address this problem by using the cluster dynamical mean-field approximation, which we newly develop on the basis of the Majorana fermion representation. Using the continuous-time quantum Monte Carlo method for the impurity solver, we calculate the magnetic susceptibility, dynamical spin structure factor, and relaxation time in the nuclear magnetic resonance. We find that these quantities show peculiar temperature dependences in the paramagnetic state when approaching the quantum spin liquid by decreasing temperature, which reflects the fractionalization of quantum spins. We will discuss the results while changing the anisotropy and sign (ferro/antiferro) of the exchange interactions, in comparison with experiments. [1] A. Kitaev, Ann. Phys. **321**, 2 (2006).

Junki Yoshitake
Dept. of Appl. Phys., Univ. of Tokyo

Date submitted: 06 Nov 2015 Electronic form version 1.4