

Abstract Submitted
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Z_2 topological classification of the $S = 1/2$ Heisenberg model on the two dimensional pyrochlore lattice SHO TANAYA, MITSUHIRO ARIKAWA, University of Tsukuba, ISAO MARUYAMA, Osaka University, YASUHIRO HATSUGAI, University of Tsukuba — We have investigated the $S = 1/2$ Heisenberg model on the two dimensional pyrochlore lattice [1] by using the Z_2 Berry phase [2] which is quantized due to the time reversal invariance. Since these Z_2 Berry phases are adiabatic invariants against change of the physical parameters, one can distinguish ground states when the quantized values are different. By suitably choosing ways of local $U(1)$ twists to define the Berry phases, one can show that the ground state in this system is adiabatically connected to a direct product state of local singlets or plaquette singlets. We have described the basic formulation and demonstrate the validity for finite systems using a Lanczos diagonalization.

[1] J.-B. Fouet, M. Mambrini, P. Sindzingre, and C.Lhuillier, Phys. Rev. B 67 (2003) 054411.

[2] Y. Hatsugai, J.Phys Soc. Jpn. 73 (2004) 2604.

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