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Density matrix renormalization group study of triangular Kitaev-Heisenberg model SHIGETOSHI SOTA, RIKEN, KAZUYA SJINJO, Yukawa Institute for Theoretical Physics, Kyoto University, TOMONORI SHIRAKAWA, RIKEN, TAKAMI TOHYAMA, Department of Applied Physics, Tokyo University of Science, SEIJI YUNOKI, RIKEN — Topological insulator has been one of the most active subjects in the current condensed matter physics. For most of topological insulators electron correlations are considered to be not essential. However, in the case where electron correlations are strong, novel phases such as a spin liquid phase can emerge in competition with a spin-orbit coupling. Here, using the density matrix renormalization group method, we investigate magnetic phase of a triangular Kitaev-Heisenberg (quantum compass) model that contains a spin-orbital interaction and spin frustration in the antiferromagnetic region. The triangular Kitaev-Heisenberg model is regarded as a dual model of the honeycomb Kitaev-Heisenberg model that is usually employed to discuss A_2CuO_3 (A=Na, K). Systematically calculating ground state energy, entanglement entropy, entanglement spectrum, and spin-spin correlation functions, we discuss the duality between the triangular and the honeycomb Kitaev-Heisenberg model as well as the ground state magnetic phases.

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