Entanglement properties of the bond alternating Heisenberg chain with general integer spins SHOHEI MIYAKOSHI, Chiba Univ, SATOSHI NISHIMOTO, IFW Dresden, TU Dresden, YUKINORI OTHA, Chiba Univ — Symmetry protected topological (SPT) phases are a gapped phase under a given symmetry. Unless any symmetries that protect the SPT phases are broken, the SPT phases can be distinguished from each other. Recently, it was pointed out that the entanglement spectrum of the many-body state characterizes such SPT phases. In particular, the degeneracy of the entanglement spectrum reflects the corresponding symmetries and edge states of the system. Motivated by recent studies of the SPT phases, we study the bond-alternating Heisenberg model with general integer spins and clarify the entanglement properties of the ground state using the density matrix renormalization group method. In particular, this model has the intermediate phase at $S > 1$ due to the bond alternation. The entanglement properties of this phase in the case of $S > 2$ have not been studied sufficiently because of the numerical difficulties under an extremely small spin-gap situation. We studied the case of $S = 1, 2, 3$ using the antiperiodic boundary condition. Under the antiperiodic boundary condition, we found that the doubly degenerate spectra which characterize the intermediate phase can be observed in the entanglement spectrum. We will also discuss the effect of the single-ion uniaxial anisotropy.

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