Chiral spin states in the pyrochlore Heisenberg magnet: Fermionic mean-field theory and variational Monte Carlo calculations JUNGHOON KIM, JUNG HOON HAN, Sungkyunkwan University — Fermionic mean-field theory and variational Monte Carlo calculations are employed to shed light on the possible uniform ground states of the Heisenberg model on the pyrochlore lattice. Among the various flux configurations, we find the chiral spin states carrying $\pm\, \pi\Delta\Theta/2$ flux through each triangular face to be the most stable both within the mean-field theory and the projected wave- function studies. Properties of the spin-spin correlation function and the chirality order parameter are calculated for the projected wave functions. Meanfield band structures are examined.

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