Emergence of novel states in low-dimensional quantum magnets

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Low-dimensional quantum magnets always reveal quite interesting and complex behaviors owing to strong quantum fluctuations and competing interactions involved in the systems, making that they not only play important roles in fundamental advances of condensed matter physics and molecular magnetism, but also may have potential applications in the field of quantum information and computation, thereby attracting much attention both theoretically and experimentally recently. In this talk, I will give a brief review on our recent results of novel emergent states in several low-dimensional quantum magnetic systems, including trimeric, tetrameric, diamond-type, decorated, and trigonal prism quantum Heisenberg spin chains, and the distorted honeycomb Heisenberg and kagome Ising magnets as well. A newly proposed algorithm-linearized tensor renormalization group-for calculating the thermodynamics of quantum lattice systems and implications are also discussed.

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