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Quantum magnetism in honeycomb lattice materials

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Enormous interests generated by graphene physics have made honeycomb lattice one of the most studied twodimensional lattice structures in recent years. In particular, the realization that bond-dependent anisotropic magnetic interactions can be found in honeycomb lattice materials with strong spin-orbit coupling has made a profound impact on quantum magnetism research. In this contribution, we will give an overview of recent experimental progress made in understanding honeycomb lattice quantum magnets with a special emphasis on the so-called Kitaev materials, such as α -RuCl₃, which is a leading candidate for realizing a quantum spin liquid phase. Prospects of incorporating such honeycomb lattice quantum magnets in an artificial heterostructure with other two-dimensional materials will be also discussed.

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