

## **New challenges in quantum magnetism**

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Quantum magnetism has played a very important role in the twentieth century, with milestones such as Bethe's solution of the spin-1/2 Heisenberg chain in 1931, spin-wave theory in 1952, or the discovery of the Haldane gap in spin-1 chains in 1983. The field is far from closed however, and several basic models of frustrated quantum magnetism are still heavily debated. In view of their potentially quite exotic properties, quantum magnetism has emerged as one of the favourite platforms to investigate quantum matter, with already several successes among which the discovery of new quantum phases such as spin nematics, spin supersolids, or fractional magnetization plateaus. Yet the best is still probably to come, and after a quick review of these successes, I will discuss some of the challenges the field is still facing, including the definitive solution of some paradigmatic models of frustrated quantum magnetism such as the Kagome spin-1/2 antiferromagnet or the experimental identification of quantum spin liquids with non-trivial topological properties.