Quantum Simulations with Ultracold Thulium Atom

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Bose-Einstein condensation (BEC) is a powerful tool for a wide range of research activities, a large fraction of which is related to quantum simulations. Various problems may benefit from different atomic species. Thulium atoms possess dipole moment of 4 Bohr magneton in the ground state, allowing long-term interactions. It also has number of non-chaotic low-field Feshbach resonances, allowing fine control of the near-filed interactions. It also has relatively simple level structure compared to the other magnetic lanthanoids and thus is a quite promising subject for applications in quantum simulations. Here we report on our efforts to cool, control collisional properties and internal state of thulium atom as well as use thulium atom for simulations.