Special Issue

Quantum Many-Body Physics with Trapped Rydberg Atoms

Message from the Guest Editor

Atoms in their highly excited electronic states, referred to as Rydberg atoms, have extraordinary nonlinear optical properties. Rydberg atoms are highly polarizable and interact with each other via dipole–dipole interactions or van-der-Waals interactions. Thus, they are very sensitive to their environment. When optically trapped at ultracold temperatures, Rydberg atoms possess quantum properties that are strongly dependent on their interatomic interactions. These interactions lead to condensed matter-like collective behavior, making Rydberg atoms a new platform to study quantum many-body physics. Spin degrees of freedom of trapped Rydberg atoms bring rich new physics, including quantum magnetism, new quantum phases and spin dynamics, entanglement, and other nonlocal correlations of multipartite quantum systems. This Special Issue of *Atoms* will review progress in this field and will highlight future important directions.

Guest Editor

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Message from the Editor-in-Chief

The scope of *Atoms* is deliberately wide and encompasses a large part of theoretical and experimental atomic,
molecular, nuclear, and chemical physics in order to encourage cross-disciplinary connections, while supporting the more traditional idea of individual subfields. The journal is also interested in papers concerning
the computation and compilation of data related to applications in the above areas. Details of experimental methods and codes are welcome. Your research is taken seriously and peer-reviewed with care. I encourage you
to contact me or any of the Editorial Board Members for further information.

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