Special Issue

High Precision Measurements of Fundamental Constants

Message from the Guest Editor

Precision experiments with atomic systems provide an important avenue for testing our understanding of the laws of nature. Along with theoretical advances, they enable significant improvement in the determination of fundamental physical constants. As an example, a 13-fold improvement in the precision of the electron mass determination (relative uncertainty of 30 ppt) was obtained by interrogating a single 12C5+ hydrogen-like ion and accounting for higher-order effects from quantum electrodynamics (QED). A direct measurement of the magnetic moment of the proton by flipping its spin in a Penning trap has now surpassed the precision of an indirect determination from the spectrum of a hydrogen maser (a 42-year-old record). The most stringent test of QED is a comparison between prediction and measurement of the anomalous magnetic moment (*g-2*) of an electron, with an independent value of the fine structure constant (*a*) coming from a cold atom interferometer. Quantum interferometry of laser-cooled atoms has also provided a precise value of the Newtonian gravitational constant (G).

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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