FM 28: Focus Talk: Quantum Spectroscopy

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An introduction to quantum spectroscopy — •Frank Schlawin — Clarendon Laboratory, University of Oxford, Parks Road, Oxford OX1 3PU, United Kingdom

Quantum light is an intriguing candidate for novel spectroscopic applications due to its nonclassical fluctuations, which can enhance the nonlinear response of a sample. For instance, it has been long established that squeezed states of light show a linear, rather than quadratic, intensity scaling of the two-photon absorption signal [1]. In addition, entangled states of light feature strong time and frequency correlations that can be further used to manipulate or control nonlinear optical signals [2].

In this focus talk, I will present an introduction into the theory of quantum spectroscopy, outline different ideas to exploit quantum features of light in spectroscopic measurements and review the current state of experiments.

[1] N. P. Georgiades et al., Phys. Rev. Lett. 75, 3426 (1995).

[2] K. E. Dorfman, F. Schlawin and S. Mukamel, Rev. Mod. Phys. 88, 045008 (2016).