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Strong-fields and photons in solids, from classical to quantum light

At the surface, strong-field physics and quantum optics seem to operate in disparate regimes of light-matter interaction. Nevertheless, the growing field of attosecond quantum optics is beginning to bridge this gap, with the solid state providing an ideal platform of study [1]. I will discuss two experiments at this intersection: in the first, we see how a photon picture emerges from a laser-dressed crystal using classical light [2]. In the second, we begin to study field-driven processes with emerging non-classical and intense sources known as bright-squeezed vacuum [3].

- [1] L. Cruze-Rodriguez et al. "Quantum phenomena in attosecond science," Nat. Rev. Phys. 19 (2023)
- [2] D. N Purschke et al. "Microscopic mechanisms of high-order wavemixing in solids," Phys. Rev. A 108 (2023)
- [3] S. Lemieux et al. "Photon bunching in high-harmonic emission controlled by quantum light" arXiv:2404.05474



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