

## **Coherence and control of individual electron spins in quantum dots**

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Thanks to a string of recent breakthroughs, it is now possible to initialize, coherently manipulate and read out the spin state of a single electron in a semiconductor quantum dot, and to couple it coherently to an electron spin in a neighbouring dot. Furthermore, we have come to a quantitative understanding of the timescales ( $\sim 1$  us) and mechanisms by which the spin loses phase coherence. I will review these developments and also present ongoing work that is focused on partial control of the electron spin environment, in particular of the nuclear spins in the host material. This should permit even longer spin coherence times. These results offer perspective on the potential of electron spins for quantum information processing.