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Photocurrent spectroscopy of self–assembled quantum dots.[1]
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— Quantum dots systems had been envisioned as possible candidates for building the hardware of quantum computers. They provide the necessary localization of electrons on length scales comparable to the electron Fermi wavelength and also exhibit distinct discrete energy spectra due to quantum confinement. Nevertheless, the characterization of optical and coherence properties of single quantum dots, especially at wavelengths larger than 1100 nm, is challenging due to the small SNR in these systems and the lack of high quantum efficiency detectors at these wavelengths. To circumvent these challenges, we use photocurrent measurements as a probe of the absorption spectra of quantum dots systems embedded in Schottky diode structures. The use of spectrally narrow laser sources allows the exciton absorption spectra of single quantum dots to be characterized as a function of temperature and magnetic field.

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