Development of High-Quality Quantum Light Sources based on II-VI Semiconductor Quantum Dots

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Abstract

Quantum light sources are the essential requirements for promising applications in quantum information science and technology. Among various quantum systems, semiconductor quantum dots (QDs), also referred to as artificial atoms, have attracted much attention because they can share both unique advantages arising from solid-state materials and atomic systems, thus can be used to generate high-quality quantum lights. Here, low-cost colloidal QDs were fabricated by using simple chemical synthesis method. By coupling to a designed plasmonic nano-antenna, the emission from single colloidal QDs can exhibit some unique features, including high emission rates, stable emission without fluorescence blinking, and extremely fast radiative decay rates. However, the purity of single-photon emission would be degraded owing to enhanced bi-exciton emission. This deep understanding can facilitate the researchers in this field to further design high-quality single-photon sources operating at room temperature based on colloidal QDs.

References

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