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Tunable-correlation phenomenon of single photons emitted from a self-assembled quantum dot SHANG YU, JIAN-SHUN TANG, YI-TAO WANG, CHUANG-FENG LI, GUANG-CAN GUO, Key Lab of Quantum Information, University of Science and Technology of China, CAS — Deterministic single-photon source plays a key role in the quantum information technology. Thus, research on various properties of such kind of light source becomes a quite necessary task. In this work, we experimentally observe that the second-order correlation properties of single photons can be continuously tuned from pulsed excitation configuration to continuous-wave excitation configuration under the near resonant photoluminescence excitation. By increasing the power of pulsed excitation laser, the effective excitation time of quantum dot can be extended with assistance of the defect states, and more continuous-wave excitation characteristics will gradually appear in the second-order correlation functions. This abnormal power-induced tunable-correlation mechanism can affect the temporal property of the single-photon source but maintain its antibunching property.

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