EDITORIAL

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Preface to the Special Issue on Quantum Light Source from Semiconductors

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The invention of laser has tremendously changed the world. Great efforts have been made to increase the laser power, in which each pulse contains many photons. On the other hand, researchers also play a lot of interests on the generation of a single photon in a single pulse, i.e., the single photon sources. Single photons and their strongly correlated components (e.g. entangled photons) have played critical roles in the development of quantum mechanics. Nowadays, these quantum light sources have also found important applications in modern quantum information processing, such as quantum communication, quantum metrology and quantum computation. Many different kinds of methods have been developed to generate these quantum light sources. Semiconductors are of particular appealing materials. They can provide a compact and robust way to generate quantum light source, which also offer great potential scalability enabled by the mature modern nanofabrication technologies. More and more flexible semiconductor quantum emitters are generated and investigated. Semiconductor quantum dots are widely used to generate single photons and entangle photons with very high quality. The intrinsic and implanted defects in bulk semiconductor material can provide stable single photons even at elevated temperature. The emitted wavelengths have been extended to the telecom range. Recently, great achievements have been obtained in improving their emission and collection efficiencies. Their abilities to interact with remoted quantum systems show the potentiality to construct a quantum network. The semiconductor quantum emitters are simulating novel applications and developing new quantum devices.

This special issue contains 6 review articles summarizing remarkable progress in quantum light generation and application using different semiconductor devices, such as zero-dimension quantum dots, one-dimension nanowires, two-dimension van der Waals materials and three-dimension bulk semiconductors. This special issue also contains 2 original articles on developing electrically driven uniaxial stress device for tuning in situ semiconductor quantum dot symmetry and exciton emission in cryostat, and observing stable single photon sources in the near C-band range above 400 K. The issue attempts to provide a latest overview of the rapidly developing research area of quantum light source from semiconductors.

We sincerely hope that this issue on quantum light source from semiconductors can benefit researchers on this topic. We would like to thank all the authors who have contributed high-quality peer-reviewed articles to this special issue. We are also grateful to the editorial and production staff of *Journal of Semiconductors* for their kind and prompt assistance.