**Drone-based quantum key distribution**

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Optical superlattices can be used for generating and manipulating of spontaneous parametric down-conversion process, thereby achieving various integrated quantum sources and devices. We have been focusing on quantum optical integration during the past years. The integrated quantum optical devices can be loaded on drones for the future mobile quantum network construction. Such drone-based mobile quantum network is flexible, reconfigurable and cost-effective, to realize full-time all-location coverage. We demonstrate the first drone-to-ground entangled photon pair distribution in multi-weather condition including daytime, clear and rainy nights. We further extend this drone-based quantum link to two drones, and realize the first optical-relayed entanglement distribution. Recently, we realize experimental demonstration of quantum key distribution using a drone, with averaged secret key rate exceeds 8 kHz. With such achievement, wireless communication can be expected with enhanced security in the quantum approach, between mobile nodes towards a network.

**Short Bio:**

**Zhenda Xie** received his PhD degree in Physics from Nanjing University, China. He is a professor at the School of Electronic Science and Engineering, Nanjing University, China. His research interests include nonlinear optics, quantum optics, and drone-based optical communication networks. He has published more than 100 SCI papers, including National Science Review, Nature Photonics, Physical Review Letters, and Light: Science & Applications. His achievement in drone-based entanglement distribution was selected as one of the “top ten social impact events in the field of optics in China in 2021” (light10). He has won the "Top Ten Youth Science and Technology Stars of Jiangsu Province" and the First Prize of the Outstanding Research Achievements Award in Natural Sciences from the Ministry of Education. His team has won the Gold Award at the Geneva International Invention Exhibition three times.