

26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Space Science Missions (2)

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SPOOQY-1, A CUBESAT TO DEMONSTRATE AN ENTANGLED PHOTON LIGHT SOURCE

Abstract

Quantum Key Distribution (QKD) is a technology that can distribute private encryption keys between two parties with strong security assurances underpinned by quantum mechanics, and entanglement-based QKD is one of the strongest forms of QKD. Performing QKD using satellites can overcome the range constraints of ground-based QKD systems imposed by atmospheric losses or attenuation in optical fibers. In 2017 satellite-based QKD was demonstrated by the Chinese Academy of Sciences' 630kg Micius satellite. The Centre for Quantum Technologies (CQT) at the National University of Singapore (NUS) is developing similar, but highly-miniaturised, QKD technologies for CubeSats. Our first technology demonstration, the first generation of our quantum light source is currently in-orbit on board of the NUS Galassia 2U CubeSat. Meanwhile, SpooQy-1 is a 3U CubeSat built at CQT that aims to validate the space-worthiness of our next generation entangled photon light source and should be in orbit and fully operational by the date of this presentation. In the follow-on QKD QubeSat mission our miniaturised entangled photon light sources will be combined with a spacecraft platform with high precision Pointing, Acquisition and Tracking System (PATS) optical communication link being developed at RAL space. The CQT technologies are being commercialized by the spinout company S-fifteen Space Systems.