

Feasibility of satellite QKD with continuous variable

Satellite links are considered as a viable solution for extending quantum communication protocols, such as quantum key distribution (QKD), to a global scale. In fact, they can overcome the main limitation of optical fiber connections, namely the attenuation that increase exponentially with distance. In this work, we estimate the expected key rates for continuous variable (CV) QKD protocol, considering a downlink scenario from a low Earth orbit satellite to the ground station. At first, we model the channel properties, such as attenuation and induced noise, focusing in particular on the fluctuations due to pointing error effects. Then, we estimate the expected key rates under realistic assumptions for the payload and receiving station. The inclusion of finite size effects in the analysis will set a tradeoff between the segmentation of the orbit based on channel transmissivity and the optimal block size for data analysis. The analysis considers both daylight and nightlight scenarios, highlighting the different behavior. This work provides quantitative information about the achievable key rate for satellite QKD in relevant scenarios, highlighting its potential and pointing out critical requirements for its actual implementation.