



Development of quantum repeater based on trapped ions at SK telecom

One of the biggest challenges in applying the current quantum key distribution (QKD) system to large area networks is that the current commercial QKD system cannot connect remote nodes separated by long distances purely in quantum states due to the inevitable attenuation in the fibers. At SK telecom, in addition to a commercial QKD system, we are also developing a quantum repeater based on trapped ions so that a QKD system can be eventually implemented completely in the quantum domain independent of the size of the network.

To build scalable quantum repeater nodes, we have been developing micro-electro-mechanical system (MEMS) fabrication processes for ion trap chips. Using these chips, we trapped both isotopes of 171 and 174 Yb ions, and confirmed that we can shuttle these ions. We can also induce Rabi oscillations with a single 171 Yb ion. In this poster, we will present our on-going research towards the implementation of quantum repeaters at SK telecom.

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