RIKEN QUANTUM COMPUTING

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32nd RQC Colloquium

Experimental Resources for Quantum Information Processing via Quantum Networks

Prof. Oliver Benson

Humboldt University Berlin

March 13, 2025(Thu) **16:00–17:00**(JST)

This colloquium will be held in **HYBRID** format.

On-site Venue: Wako C61 Welfare and Conference Building, 2F Large Meeting Room

Online Venue: Zoom. To receive the link, register in advance at https://krs2.riken.jp/m/rqc_registration_form

Applications of quantum networks such as long-distance secure quantum communication with quantum repeaters or distributed quantum computing require photon sources complemented by several quantum photonic components. I will introduce our recent results on two such components, i.e., a quantum memory and a frequency converter. Our memory is based on electromagnetically induced transparency in a warm atomic vapor cell. It offers a small footprint, and its performance can be enhanced through integrated waveguide structures. Combined with our two-step frequency converter, this memory can be seamlessly incorporated into our quantum telecom fiber network in Berlin. I will also discuss future directions, including the generation of complex quantum states of light and hybrid integration of additional quantum elements.