

# Optical quantum information processing

Prof. **Peter van Loock**

University of Mainz

**Mar. 15, 2023** (Wed) **17:00–18:00** (JST)



This colloquium will be held **ONLINE**.

Registration: [https://krs2.riken.jp/m/rqc\\_registration\\_form](https://krs2.riken.jp/m/rqc_registration_form)

The photonics approach to quantum information processing has various benefits compared with other, matter-based platforms. In particular, light is robust to decoherence at room temperature, it is the optimal, fastest information carrier in communication applications, and, similarly, pure photonics can be operated at high clock rates. However, universal quantum information processing is typically hard to obtain with photons due to the lack of sufficiently strong, nonlinear interactions. Moreover, it depends on the quantum optical encoding whether the effect of photon loss can be detected or even corrected. We give an overview of the most commonly employed approaches to optical quantum information and our contributions to this, including photonic quantum error correction and ultimate applications involving quantum light, such as quantum repeaters for long-distance quantum communication and measurement-based quantum computing.