

Advanced Quantum Networks - Future Applications and Technology Demonstrations

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Classical communication is the basis for many of our current and future technologies, such as mobile phones, video conferences, autonomous vehicles and particularly the internet. It is not unlikely, that quantum communication and quantum networks might open up novel opportunities on a similar scale. Governed by the basic laws of quantum mechanics, quantum networks might offer enormous benefits for security applications, more precise measurements, faster computations, and many other fields of application by interconnecting different quantum devices, such as quantum sensors, quantum computers, or quantum memories [1,2].

In this talk, we provide an overview of ongoing research activities in our group regarding quantum information networks and their future opportunities. In particular, we address topics such as blind quantum computing, quantum authentication, a development roadmap for quantum networks and technology demonstrations. Moreover, we present steps towards establishing an entanglement-based quantum information network in Ulm and beyond.

- [1] K. Bongs et al., Weltweite Vernetzung der Quantentechnologien: Quantenkommunikation via Satellit, Phys. Unserer Zeit, 56:116 (2025).
- [2] B. Kubala et al., Advanced Quantum Communication and Quantum Networks, arXiv:2602.06781v1 (2026).