

## PhoQSNET

The goal of PhoQSNet is to provide the infrastructure for a three-node testbed quantum network. This will allow various configurations of quantum communication technology to be explored, including point-to-point protocols, quantum relays and quantum repeater nodes, among many other schemes. We will explore protocols using both discrete- and continuous-variable encoding of quantum information, as well as hybrid schemes

### A: Brief Information

<b>Testbed Title</b>	PhoQSNET	
<b>Start Point</b>	Heinz Nixdorf Institut (HNI)	
<b>End point</b>	1: Universität Paderborn	2: Universität Paderborn
<b>Institution/Organization</b>	Universität Paderborn, PhoQS	
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<b>Status</b>	setup phase	

### B: Technical Information

<b>Type of Transmission</b>	fiber
<b>Length [km]</b>	9
<b>Losses [dB]</b>	not tested yet
<b>Supported Wavelengths [nm]</b>	Telecom (any bands)
<b>Type of Fiber</b>	single mode
<b>Type of Deployment</b>	Combined
<b>Polarization Stabilization</b>	Yes
<b>Quantum Communication Infrastructure</b>	single/entangled/ CV sources, FWM sources, parametric downconversion, SSPDs, Memory, Synchronization
<b>Available Infrastructure for external Parties</b>	access upon request and agreement

## C: Additional Information

<b>Linked Projects</b>	<ul style="list-style-type: none"><li>• PhoQS: <a href="https://www.uni-paderborn.de/projekt/696">https://www.uni-paderborn.de/projekt/696</a></li><li>• EU-Projekt QSNP: <a href="https://qsnp.eu/">https://qsnp.eu/</a></li><li>• QR.N: <a href="https://www.forschung-it-sicherheit-kommunikationssysteme.de/projekte/quantenrepeater-net-qr.n">https://www.forschung-it-sicherheit-kommunikationssysteme.de/projekte/quantenrepeater-net-qr.n</a></li><li>• QR.X: <a href="https://quantenrepeater.link/">https://quantenrepeater.link/</a></li></ul>
<b>Press Release and Publications</b>	<ul style="list-style-type: none"><li>• <a href="#">Highly secure data transfer using quantum technology</a>, 04.2023</li><li>• <a href="#">BLB NRW übergibt PhoQS Lab an die Universität Paderborn</a>, 04.2025</li></ul>
<b>Demonstrated Milestone</b>	<ul style="list-style-type: none"><li>• network currently setup and tested</li></ul>
<b>Outlook</b>	<ul style="list-style-type: none"><li>• Quantum repeater testbed and demonstrator using warm rubidium vapour, semiconductor quantum dots and non-linear sources.</li></ul>
<b>Suggested Use Cases</b>	<ul style="list-style-type: none"><li>• Entanglement assisted QKD with co-propagation of classical signal</li><li>• Quantum repeaters</li><li>• Distributed quantum computing</li></ul>
<b>Other Comments/ Information</b>	