

## Dresden Quantum Communication Fiber Testbed IIS/IVI

This testbed is continuously used by Fraunhofer IIS for quantum electronics development and testing as well as for scientific research. It is also available to all potential partners from industry and academics.



### A: Brief Information

<b>Testbed Title</b>	Dresden Quantum Communication Fiber Testbed IIS/IVI
<b>Start Point</b>	Fraunhofer IIS, Dresden
<b>End Point</b>	Fraunhofer IVI, Dresden
<b>Operator</b>	IIS with SachsenGigaBit GmbH
<b>Contact</b>	Dr. Stefan Krause: <a href="mailto:stefan.krause@eas.iis.fraunhofer.de">stefan.krause@eas.iis.fraunhofer.de</a> Dr. Mandy Grobosch: <a href="mailto:mandy.grobosch@iis.fraunhofer.de">mandy.grobosch@iis.fraunhofer.de</a>
<b>Status</b>	active

### B: Technical Information

<b>Type of Transmission</b>	dark fiber
<b>Length [km]</b>	10 km loop (20 km with circulator)
<b>Losses [dB]</b>	6.3 (13.7) @ 1550 nm

<b>Supported Wavelengths [nm]</b>	O-band (1310 nm) to C-band (1550 nm)
<b>Type of Fiber</b>	single mode
<b>Type of Deployment</b>	underground
<b>Polarization Stabilization</b>	Yes
<b>Quantum Communication Infrastructure</b>	<ul style="list-style-type: none"> <li>entangled photon source @ 810 nm and @ 1550 nm;</li> <li>single photon detectors @ vis and @ 1550 nm; synchronization equipment;</li> <li>time tagger;</li> <li>analyses modules for polarization and time-energy entangled photons</li> </ul>
<b>Available Infrastructure for external Parties</b>	access upon request and agreement; available infrastructure: access to entangled photon source, single photon detectors, electronics and analyses optics, internet

### C: Additional Information

<b>Linked Projects</b>	<ul style="list-style-type: none"> <li>Q-NET :<a href="https://qunet-initiative.de/">https://qunet-initiative.de/</a></li> <li>Projekt MoNeQua: <a href="https://www.eas.iis.fraunhofer.de/de/anwendungsfelder/mikroelektronik/monequa.html">https://www.eas.iis.fraunhofer.de/de/anwendungsfelder/mikroelektronik/monequa.html</a></li> <li>Projekt MoNeQua II: <a href="https://www.eas.iis.fraunhofer.de/de/anwendungsfelder/mikroelektronik/monequa2.html">https://www.eas.iis.fraunhofer.de/de/anwendungsfelder/mikroelektronik/monequa2.html</a></li> <li>6G-QuaS: <a href="https://www.forschung-it-sicherheit-kommunikationssysteme.de/projekte/6g-quas">https://www.forschung-it-sicherheit-kommunikationssysteme.de/projekte/6g-quas</a></li> </ul>
<b>Press Release and Publications</b>	<ul style="list-style-type: none"> <li><a href="#">Application Center Quantum Communication with new services, 02.2023</a></li> <li><a href="#">Quantum Technology to Safeguard the Future of Confidential Information Exchange</a></li> <li><a href="#">Erste erfolgreiche Probeläufe zur quantengesicherten Datenübertragung in Sachse, 03.2022</a></li> </ul>
<b>Demonstrated Milestone</b>	<ul style="list-style-type: none"> <li>photonic entanglement (polarization and time-energy) distribution over 20 km of deployed fiber</li> </ul>

<b>Outlook</b>	<ul style="list-style-type: none"><li>• test bed for QKD software development;</li><li>• test bed for microelectronics development for photonic quantum technologies;</li><li>• super dense coding experiments;</li><li>• space division multiplexing with classical signals;</li><li>• quantum synchronization studies</li></ul>
<b>Suggested Use Cases</b>	<ul style="list-style-type: none"><li>• Damping tests under realistic conditions</li><li>• Test of optical and electronic components for external partners</li></ul>
<b>Other Comments/ Information</b>	This testbed will be extended towards an inter-city link between Dresden and Chemnitz and potentially to Fraunhofer IOF in Jena.