

Hollow-core optical fiber for quantum communication



Overview

Hollow core fibres (HCFs) are emerging as a revolutionary technology for quantum communications, particularly in the distribution of single-photon-based quantum keys. Recent demonstrations have highlighted several advantages of HCFs over traditional glass-guiding fibres. The early version of HCF based on photonic-bandgap guidance has not proven itself a reliable quantum. Although standard silica-core single-mode fibers (SMF) have seen significant advances in recent decades, current fiber-networks face capacity limitations due to increasing demand for lower latency and higher data rates per wavelength band [6,7]. However, glass imposes a fundamental physical limitation because light travels through it approximately 30 percent slower than through air. In standard silica. We address this by employing a hollow-core fiber engineered for low-loss transmission at quantum dot wavelengths, with measured loss of 0.65 dB/km and potentially as low as 0.

Article Content

Apr 27, 2026

Demonstration of Entanglement Based and DWDM Compatible Quantum

We demonstrate a quantum alert mechanism that uses quantum entanglement and random frequency hopping for eavesdropper monitoring in a classical optical network.

May 04, 2026

Quantum Repeater Architectures in the Hollow-Core Fibre Era ...

Quantum repeater-based communication over standard single-mode fibre (SMF) is fundamentally constrained by attenuation and propagation delay. Recent advances in hollowcore fibre (HCF) offer

Jan 28, 2026

Fiber Optics

Fiber Optics Uncover the latest and most impactful research in Fiber Optics. Explore pioneering discoveries, insightful ideas and new methods from leading researchers in the field.

Oct 27, 2025

OFC 2026 Exhibit Connects the Global Optical Ecosystem Powering

LOS ANGELES — Feb. 12, 2026 — As Artificial Intelligence (AI) and cloud-scale computing drive rising demand for bandwidth and energy efficiency, the 2026 Optical Fiber Communications Conference

Sep 05, 2025

High-fidelity, low-latency polarization quantum state transmissions ...

Hollow-core fiber (HCF) promises to unify air-borne light propagation and non-line-of-sight transmission, thus holding great potential for versatile photonics-based quantum information...

Dec 11, 2025

Breaking isotropic symmetry: Polarization-dependent enhanced ...

Polarization purity and dispersion characteristics of nested antiresonant nodeless hollow-core optical fiber at near- and short-wave-IR wavelengths for quantum communications. I. AfxentiLijun Yu +5

Dec 19, 2025

Hollow-Core Optical Fibers for Telecommunications and

Hollow-core optical fibers (HCFs) have unique properties like low latency, negligible optical nonlinearity, wide low-loss spectrum, up to 2100 nm,

Feb 07, 2026

2026 Special Symposia - CLEO

Special Symposia CLEO The premier international forum for scientific and technical optics. REGISTER NOW Looking for the full CLEO schedule? Explore the

Sep 18, 2025

AWS Adopts Hollow-Core Fiber to Boost Data Speeds

This leap in fiber-optic infrastructure isn't just about speed. Because the hollow-core design drastically reduces signal attenuation, data can travel longer distances before requiring

May 18, 2026

Polarization purity and dispersion characteristics of nested ...

A newly emergent HCF technology, known as Nested Antiresonant Nodeless Fiber (NANF), demonstrates a significant reduction in confinement losses. This improvement is achieved by

Oct 04, 2025

VIAVI Announces Industry's First Long-Range Hollow

Viavi launches an all-in-one hollow core fiber tester for OTDR, PMD, CD and AP, validated with three hyperscalers and built for long-range AI links.

May 05, 2026

Hollow-core Fibers Market Size, Trends, 2026-2033 Forecast

The integration of hollow-core fibers into emerging applications such as quantum key distribution, space-based communication, and autonomous vehicle networks presents substantial

Dec 02, 2025

Adjacent nested 4-tube hollow-core anti-resonant fiber

The 4-tube hollow-core anti-resonant fiber to achieve lower loss single-mode transmission by adding nested adjacent inner tubes. Significantly, the loss spectrum of 4-tube 4AN-ARF has a

Mar 26, 2026

(PDF) Quantum Communication with Quantum Dots Beyond Telecom ...

We address this by employing a hollow-core fiber engineered for low-loss transmission at quantum dot wavelengths, with measured loss of 0.65 dB/km and potentially as low as 0.12 dB/km

Dec 01, 2025

Hollow Core Fiber Market 2025

Growing Demand for High-Speed Communication – Increasing adoption of high-speed optical networks is propelling the demand for hollow core fibers. Advancements in Laser Technology – High-power

Jun 29, 2025

Impact of Higher-Order Modes on Mode Field Diameter Measurement

We systematically investigate the influence of higher-order modes on the mode field diameter measurement of hollow-core fibres using the S2 technique. The effects of various experimental

Sep 29, 2025

Antiresonant Hollow-Core Fiber in Quantum Comms

Hollow core fibres (HCFs) are emerging as a revolutionary technology for quantum communications, particularly in the distribution of single-photon

Jan 31, 2026

OFC 2025 Concludes in San Francisco

Hollow Core Fiber: One of the most talked-about innovations on the show floor was the emergence of hollow core fiber (HCF) technologies, which promise to revolutionize optical

May 09, 2026

Hollow-Core Fibers (HCF): The Next Frontier in Optical

Introduction For decades, optical fibers have relied on a solid glass core to guide light and have formed the backbone of global telecommunications. However,

Jul 15, 2025

Specialty Optical Fiber Cable Market Size, Trends, 2026-2033

Emerging segments such as hollow-core fibers are gaining attention for ultra-low latency applications, especially in quantum computing and high-frequency trading.

May 05, 2026

Hollow-core Photonic Crystal Fiber technology

GLOphotonics designs and produces gas-phase photonic components based on an innovative hollow-core micro-structured optical fiber technology.

Aug 12, 2025

Hollow core fiber occasions a paradigm shift in testing

Hollow core fiber marks a turning point in fiber technology. But first, there are obstacles to overcome In Sept, 2025, Microsoft Azure announced it is

May 02, 2026

Quantum Communication With Quantum Dots Via Hollow-Core

This research demonstrates a significant advance in quantum communication through the successful transmission of single photons via a specially engineered hollow-core fibre.

Jul 03, 2025

Microsoft's hollow core fiber delivers the lowest signal

Microsoft has achieved a breakthrough in the hollow core fiber technology, reducing data transmission loss to just 0.091 dB per kilometer, the

Dec 01, 2025

Wavelength Allocation in Hollow-Core-Fiber-Based Future Quantum

In this paper, we present a quantum-secured optical fronthaul architecture utilizing hollow-core fiber and propose op-timized wavelength allocation for classica

Sep 30, 2025

News | VIAVI Announces Long-Range Hollow Core Fiber Bidirectional ...

Hollow core fiber technology is being increasingly adopted for data center interconnect between hyperscale campuses for AI, high-frequency financial trading, quantum communication, defense and

Feb 23, 2026

Quantum Communication with Quantum Dots Beyond Telecom

In this letter, we propose and demonstrate a novel approach using hollow-core fibers (HCFs) with widely separated low-loss windows to transmit strong classical light at 1550 nm alongside QD single

Jun 06, 2026

Coexistence of entanglement-based quantum channels

We experimentally demonstrate the coexistence of three entanglement-based quantum channels with carrier-grade classical optical

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://elagage-lorrain.fr>

Email: sales@elagage-lorrain.fr

Phone: +33 6 47 82 19 35

Address: 15 Rue de la République, 69002 Lyon, France

This document is for informational purposes only. Specifications subject to change without notice.

