

Latest Developments in HCF Hollow Core Optical Fiber



Summary of Content

Hollow-core optical fibers (HCFs) now achieve record-low attenuation below 0.1 dB/km and 45% faster data transmission, with commercial deployments underway in AI and low-latency networks.

Breakthrough Performance

Recent advances in HCF, particularly Double Nested Antiresonant Nodeless Fibers (DNANF), have dramatically improved optical performance. These fibers guide light through an air-filled core surrounded by ultra-thin concentric glass membranes, minimizing interaction with glass and reducing signal loss. Laboratory tests report attenuation as low as 0.091 dB/km at 1550 nm, surpassing the theoretical limit of conventional silica fibers (~ 0.14 dB/km), and maintaining losses below 0.2 dB/km across a 66 THz bandwidth. Transmission speeds are up to 45% faster than traditional fibers, with latency reduced to 3.3–3.5 $\mu\text{s}/\text{km}$, compared to ~ 5 $\mu\text{s}/\text{km}$ in solid-core fibers.

Commercial Deployment and Industry Adoption

Microsoft, through its acquisition of Lumenity, has deployed over 1,200 km of DNANF HCF in live Azure networks, with plans to expand to 15,000 km to support AI and cloud infrastructure. In Asia, commercial anti-resonant HCF lines have been launched for financial services, achieving attenuation as low as 0.065 dB/km, setting new global records. The technology is being adopted in data center interconnects, high-frequency trading, and AI-driven networks, where ultra-low latency and high bandwidth are critical.

Article Content

[OFC 2026] Part 5 of 5: Hollow-Core Fiber and Next-Gen

Microsoft crossed 442 km with commercial transceivers, Nokia showed that half HCF is enough, and Sumitomo

Hollow core fiber: power and precision for critical networks

As fiber-optic networks must continuously adapt to the exponential growth of data while maintaining low latency, a

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

A comparison between solid-core silica fibers and hollow-core fibers is presented, focusing on telecom

Hollow-core fiber made of ultralow expansion glass: Toward the

Here, we demonstrate an HCF made from an ultralow expansion glass that exhibits a three orders of magnitude lower

Hollow-Core Fiber Optic Innovations

YOFC has showcased significant technological breakthroughs in hollow-core fiber optics at

Optics & Photonics News

Feature The Light at the End of the Tunnel Susan Curtis Recent innovations in hollow-core fiber are

Recent Advances in Hollow-Core Optical Fibers

Hollow core fibers (HCFs) guide light in a central void running down their length, thereby avoiding the strong light: glass

Photonics | Special Issue : Advances in Hollow-Core Optical Fibers ...

This Special Issue invites original research articles showcasing the latest theoretical, numerical, and experimental advances in

YOFC Unveils Breakthrough Hollow-Core Fibre

20th April 2025, Kathmandu Yangtze Optical Fibre and Cable Joint Stock Limited Company (YOFC) (stock

Why hollow-core fiber is the next big leap in optical connectivity

Introduction Hollow-core fiber (HCF) is a breakthrough technology poised to revolutionize the telecommunications industry. With

Recent Progress in Development of Hollow-Core Fibers for ...

This is a follow-on review of progress in development and applications of hollow core optical fibers (HCFs) after

YOFC Unveils Game-Changing Hollow-Core Fibre Advances at OFC

These technological advancements were demonstrated through a 21.7 km long hollow-core fibre with a proprietary

Hollow-core fiber

Hollow-core fiber (HCF) is a novel optical fiber technology with a hollow core, where light propagates primarily through

Hollow-core optical fibers: current state and development prospects

Recent advances in reducing optical losses and the prospects for telecommunication applications of hollow-core fibers, issues of

OFC 2025 Insights – 2 □Are we Ready for Hollow Core Fiber Networks?

Transceiver Compatibility: Development of transceivers capable of fully utilizing HCF's bandwidth potential. Full

Major Breakthrough: Hollow-Core Fiber Shatters Physical Limits

A Microsoft-supported research team, Lumenity, recently announced the development of a new HCF hollow-core

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,

YOFC Unveils Game-Changing Hollow-Core Fibre

At the OFC Conference, from March 30 to April 3, 2025, at San Francisco's Moscone Center,

(PDF) Hollow-Core Optical Fibers

PDF | Today hollow-core optical fibers (HCF) are on the verge of surpassing the attenuation benchmark of sil-ica

OFC 2025: Hollow core fiber hype stands out amid the

Developments around hollow core fiber (HCF), subsea connectivity, pluggables, and

Hollow core fiber cable technologies

Hollow core fibers (HCF) are innovative optical fibers having the potential to break the limits of conventional optical

Recent Progress in Development of Hollow-Core Fibers

Standardization is blocked by multiple fiber designs being tried, with no clear winner

On the Benefits of Hollow-Core Fiber in Next-Generation Optical ...

While silica-based fibers have been the go-to solution in optical communications for the past 50 years, recent advancements in

Novel hollow-core optical fiber transmits data 45% faster with record ...

Another option is the hollow-core fiber (HCF), which theoretically allows for faster speeds due to the ability of light to

Hollow-Core Fiber in 2026

Discover how hollow-core fiber (HCF) in 2026 sends light through an air-filled channel instead of solid glass, so signals

Hollow-Core Fiber: Pioneering a New Era in Optical

Traditional solid-core fiber has reached its performance limits in high-speed transmission,

Hollow-core breakthrough

In summary, the demonstration of hollow core fibres with lower loss and broader bandwidth than silica fibres

Novel hollow-core optical fiber transmits data 45% faster with record ...

But now, researchers from the University of Southampton and Microsoft claim to have made a breakthrough in HCF

Contact Us

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

Website: <https://madibabayelectrical.co.za>

Email: sales@madibabayelectrical.co.za

Phone: +27 63 947 2185

Address: 15 Fredman Drive, Sandton, Johannesburg, 2196, South Africa

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