

Press release

Politecnico di Torino demonstrates ultra long haul WDM transmission with Lumenisity® NANF hollowcore fibre reaching beyond 5000km

10 June 2021 Romsey, UK: Earlier this week, Lumenisity® Limited reported [recirculating loop transmission in a field deployable cable of over 1000km at 400 Gbit/s across the C band and well over 100km at 800 Gbit/s](#) in collaboration with Ciena.

Today it is reported that Politecnico di Torino and LINKS Foundation have undertaken laboratory trials using Lumenisity's state-of-the-art NANF® hollowcore technology to investigate the ultimate reach performance of the fibre. Over the last few years, there have been improvements to the fibre design and fabrication, leading to the latest generation of fibres now being capable of multi-thousand km transmission. Thanks to the advanced testing set-up of the PhotoNext Lab (joint facility of Politecnico di Torino and the LINKS Foundation), this NANF capability has indeed been demonstrated, with some channels reaching almost 6000km. This is further demonstration that there appears to be no fundamental limits in Lumenisity's NANF hollowcore technology for its evolution towards future long-haul applications.

Lumenisity develops and manufactures advanced cable solutions to address the need for high speed transactions and bandwidth increases in advanced communications systems. Lumenisity's CoreSmart® hollowcore cable solutions use a unique nested anti-resonant nodeless fibre (NANF) patented technology. Using the latest version of NANF technology with reduced inter-modal interference (IMI), PhotoNext lab has reported record new transmission distances. 11.5km of 5-tube NANFs were used in two recirculating loop experiments. The first was comprised of NANF and some PSCF, where 41xPM-QPSK C band channels @32GBaud were recirculated up to 2070km. The second recirculating loop used only NANF, pushing the maximum reach further and achieving an impressive 4020km, with several channels reaching beyond 5000km. More details on this experiment will be shared in the postdeadline paper session at 9:00-9:15AM (PDT) on Friday 11th June 2021 during OFC.

Lumenisity's CoreSmart NANF technology is robustly single moded which provides continuous uninterrupted simultaneous single mode transmission at 1310nm, as well as over the full C and L bands and beyond. The advanced NANF technology offers the promise of realising loss values at, or better than, conventional solid silica core fibres.

These results show that the development of NANF technology has substantially reduced IMI. As the current loss (~1dB/km) is reduced to levels comparable to standard fibres in the near future, while maintaining the IMI shown in these experiments, NANF could become a promising alternative for higher-throughput long haul systems and networks.

Prof. Pierluigi Poggiolini, Coordinator of the OptCom Group of Politecnico di Torino, said "NANF is one of the most exciting technologies currently on the optical landscape. We believed in it early on and started a close collaboration with the ORC at Southampton and now with Lumenisity too, to prove the potential of NANF in all segments of optical systems and networks. The results have been so far fantastic."

Dr. Antonino Nespola, Head of the PhotoNext laboratory for the LINKS Foundation commented "The transmission distance presented at this year's OFC postdeadline session is more than six times longer than the previous record reported at OFC last year. At the





current rate of improvement, the low loss and ultralow nonlinearity across very wide bandwidths could make NANF the trustable candidate for increasing the throughput and capacity of the next-generation optical systems”.

Prof. Francesco Poletti added “Hollowcore technology has made giant steps in recent years. At an OFC postdeadline session in 2013 we reported data transmission over 300 metres of photonic bandgap fibre. Fast forward 8 years, change the technology to NANF and add invaluable collaborations with Lumenisity and PhotoNext Lab, and multi-thousand kilometres become possible. There is more work still to be done, but the future looks bright for hollowcore fibres”.

Mike Fake, Lumenisity’s Director responsible for Product Management, said “These results in fibre are complementary to those we have reported this week in deployable cable formats and further underpins our confidence in the technology platform we are bringing to market for high-capacity networks with the promise of not only achieving this in the Metro Network today but also in long reach applications in the future”.

About Lumenisity® Limited

Lumenisity® Limited was formed in early 2017 as a spin out from the University of Southampton to commercialise breakthroughs in the development of hollowcore optical fibre. The company has built a team of industry leaders and experts to realise their goal to be the world’s premier high-performance hollowcore fibre optic cable solutions provider offering their customers reliable, deployable, low latency and high bandwidth connections that unlock new capabilities in communication networks. Lumenisity®, NANF®, Hollowcore TradeSmart® and CoreSmart® are registered trademarks of Lumenisity Limited.

OFC booth number: 2935

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