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Bjarklev, Anders Overgaard; Riishede, Jesper

Published in:

Proceedings of the 2002 4th International Conference on Transparent Optical Networks, 2002.

Link to article, DOI:

[10.1109/ICTON.2002.1007862](https://doi.org/10.1109/ICTON.2002.1007862)

Publication date:

2002

Document Version

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Bjarklev, A. O., & Riishede, J. (2002). Photonic crystal fibres - a variety of applications. In Proceedings of the 2002 4th International Conference on Transparent Optical Networks, 2002. IEEE. DOI: 10.1109/ICTON.2002.1007862

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Photonic Crystal Fibers - a Variety of Applications

Anders Bjarklev and Jesper Riishede

Technical University of Denmark, Lyngby, Denmark

ABSTRACT

In 1987, it was suggested that the electronic bandgaps in semiconductors could have an optical analogy - the so-called photonic bandgaps (PBGs), which could be found in periodic dielectric structures. This suggestion initiated research activities that the past few years have led to a new class of optical fibers, in which the cladding structure consists of a periodic system of air holes in a matrix of dielectric material - typically silica. These fibers have been given several names ranging from holey fibers, microstructured fibers, photonic crystal fibers, to photonic bandgap fibers. These fibers have today reached a level of maturity where they may be used as building blocks for a variety of new applications. Today's research is focusing increasingly on applications of the fibres, thus redirecting earlier focus on crystal fibers themselves and their unique guiding mechanisms. Some of the new applications that are receiving a significant amount of attention are based on nonlinear effects - super continuum generation and applications of such being highly studied examples. In this presentation, we will discuss the basic properties of photonic crystal fibers and highlight their unique features. Furthermore, we will point towards the future of this technology and address a number of potential applications of the fibers.