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The properties of photonic crystal fibers

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Abstract—The main objective of this search is, to study the photonic crystal fibers; we were interested in the characterization of optical photonic crystal fiber's properties by studying the impact of geometric distortions on chromatic dispersion and attenuation.

It will first be a question of giving a definition of these fibers which present a new category of waveguide and have advantages and unique characteristics, then we will discuss their different types which are hight index core fibers and photonic Bandgap fibers; then, in a second step, we will approach the properties of these fibers which are: Endlessly single-mode photonic crystal fiber which allows us to obtain a broadband single-mode fiber, the chromatic dispersion, the effect of losses (by absorption, by curvature, by diffusion), the effective area and the birefringence which results in the difference among the effective index of the two orthogonal polarizations of an optical wave.

In this context, we carried out a purely theoretical work based on the study of the different properties of photonic fibers. this work allowed us to see the effect of each parameter on the propagation of optical signals which exceeds the limitations of standard fibers, which allows us to offer solutions based on these fibers thereafter, and we are also convinced that this work is only a primary step for more in-depth practical research.

Keywords:PCF, Chromatic dispersion, Attenuation, Effective index, Photonic Crystal Fiber

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Topics

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Primary author: HARRAT, ASSIA AHLEM (Engineering departement. Belhadj BOUCHAIB University Ain-Temouchent, Algeria)

Co-authors: Dr DEBBAL, Mohammed (Engineering departement. Belhadj BOUCHAIBUniversity Ain-Temouchent, Algeria Telecommunication laboratory Tlemcen, Algeria); Dr OUADAH, Mohammed Chamse Eddine (Engineering departement. Mouloud MAMMERI University Tizi-Ouzou, Algeria Telecommunication laboratory Tlemcen, Algeria); Ms MIRED, Ilhem (Engineering departement. Belhadj BOUCHAIBUniversity Ain-Temouchent, Algeria)

Presenter: HARRAT, ASSIA AHLEM (Engineering departement. Belhadj BOUCHAIB University Ain-Temouchent, Algeria)

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