



Calculation of the bandwidth of W-type photonic crystal fibers by time-dependent power flow equation



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ARTICLE INFO

Keywords:

Photonic crystal fiber
W-type fiber
Power flow equation
Bandwidth

ABSTRACT

A multimode photonic crystal fiber with a solid-core takes the characteristic W-shaped index profile upon forming an inner cladding layer with its own value of the effective refractive index corresponding to the distinct size and/or spacing of air holes in it. For various arrangements of air-holes, bandwidth is determined for such fiber by the time-dependent power flow equation. Fiber bandwidth is thus not only a function of transmission length but also of the spacing and size of air-holes as well of the number of bands with the distinct configuration of holes. These additional adjustable geometric parameters offer greater design flexibility. We have shown that bandwidth can be improved by reducing the number of rings of inner cladding air holes, decreasing the diameter of inner cladding air holes or exciting only guiding modes.

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<https://doi.org/10.1016/j.optcom.2018.06.074>

Received 1 March 2018; Received in revised form 29 May 2018; Accepted 25 June 2018

Available online 30 June 2018

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