# Analysis of strictly bound modes in photonic crystal fibers by use of a source-model technique

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We describe a source-model technique for the analysis of the strictly bound modes propagating in photonic crystal fibers that have a finite photonic bandgap crystal cladding and are surrounded by an air jacket. In this model the field is simulated by a superposition of fields of fictitious electric and magnetic current filaments, suitably placed near the media interfaces of the fiber. A simple point-matching procedure is subsequently used to enforce the continuity conditions across the interfaces, leading to a homogeneous matrix equation. Nontrivial solutions to this equation yield the mode field patterns and propagation constants. As an example, we analyze a hollow-core photonic crystal fiber. Symmetry characteristics of the modes are discussed and exploited to reduce the computational burden. 

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