


Communication

# Calculation of Bandwidth of Multimode Step-Index Polymer Photonic Crystal Fibers

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**Abstract:** By solving the time-dependent power flow equation, we present a novel approach for evaluating the bandwidth in a multimode step-index polymer photonic crystal fiber (SI PPCF) with a solid core. The bandwidth of such fiber is determined for various layouts of air holes and widths of Gaussian launch beam distribution. We found that the lower the NA of SI PPCF, the larger the bandwidth. The smaller launch beam leads to a higher bandwidth for short fibers. The influence of the width of the launch beam distribution on bandwidth lessens as the fiber length increases. The bandwidth tends to its launch independent value at a particular fiber length. This length denotes the onset of the steady state distribution (SSD). This information is useful for multimode SI PPCF applications in telecommunications and optical fiber sensing applications.

**Keywords:** photonic crystal fiber; PMMA fiber; step-index fiber; power flow equation; bandwidth



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