

Influence of mode coupling on angular division multiplexing in seven-core plastic optical fibers

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Abstract

We propose an angular division multiplexing in new designed multicore plastic optical fiber with seven cores arranged in a hexagonal array. The influence of mode coupling on two-channel angular division multiplexing capability in each of seven cores is investigated by solving the power flow equation. Our numerical results show that mode coupling significantly limits the fiber length at which the angular division multiplexing can be realized in each of seven cores with a minimal crosstalk between two neighbor angular optical channels. Two angular channels in the proposed seven-core plastic optical fiber can be employed with a minimal crosstalk up to the fiber length which is about 20% of the coupling length (fiber length where equilibrium mode distribution is achieved). Such characterization of multicore optical fibers should be considered in designing a multicore optical fiber transmission system for space division multiplexing.

Keywords: multicore plastic optical fibers, angular division multiplexing, mode coupling

(Some figures may appear in colour only in the online journal)