Simple analytical expression for crosstalk estimation in homogeneous trench-assisted multi-core fibers

An analytical expression for the mode coupling coefficient in homogeneous trench-assisted multi-core fibers is derived, which has a simple relationship with the one in normal step-index structures. The amount of inter-core crosstalk reduction (in dB) with trench-assisted structures compared to the one with normal step-index structures can then be written by a simple expression. Comparison with numerical simulations confirms that the obtained analytical expression has very good accuracy for crosstalk estimation. The crosstalk properties in trench-assisted multi-core fibers, such as crosstalk dependence on core pitch and wavelength-dependent crosstalk, can be obtained by this simple analytical expression.

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