Linear and nonlinear waveguiding of few-cycle optical solitons in a planar geometry

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Résumé en anglais	We consider the guiding of a few-cycle optical soliton by total internal reflexion, in a planar geometry. By means of numerical solution of a cubic generalized Kadomtsev-Petviashvili equation, we show that, for intensities high enough to induce soliton formation, the nonlinear effects considerably widen the guided mode and can even prevent guiding for the shortest pulses and the narrowest waveguides. However, waveguiding can be achieved by means of a steep variation of the nonlinear coefficients, e.g., by using a higher nonlinear coefficient in the cladding than that in the waveguide core. We further propose an analytical approach for extremely narrow guides, which allows us to derive a modified Korteweg–de Vries-type model for the propagation of few-cycle optical solitons in the planar waveguide.
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[1] http://okina.univ-angers.fr/herve.leblond/publications
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