NUMERICAL SIMULATION OF NONLINEAR AND NONRECIPROCAL OPTICAL WAVEGUIDES

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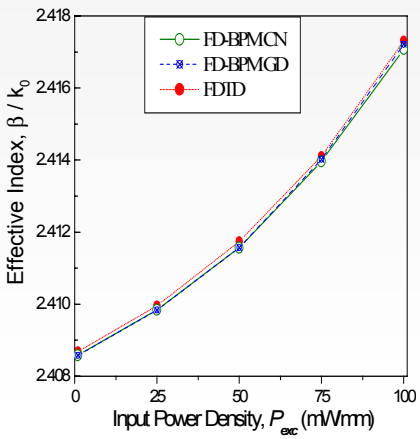
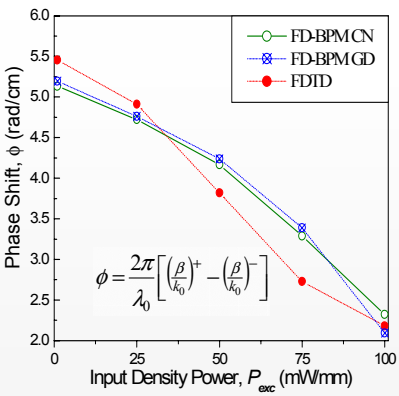
Summary — **A wide-angle finite-difference beam-propagation method (FD-BPM) formalism is being developed for the simulation of optical waveguides employing both nonlinear and nonreciprocal materials simultaneously. This formalism can be successfully applied to nonlinear Kerr-type materials exhibiting any nonlinearity mechanism. The nonreciprocal behavior is based on the difference between forward and backward propagation constants.**

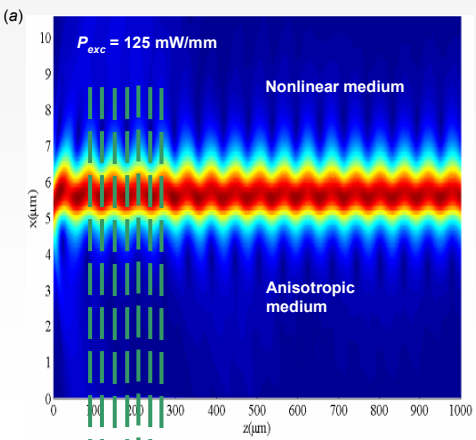
Results

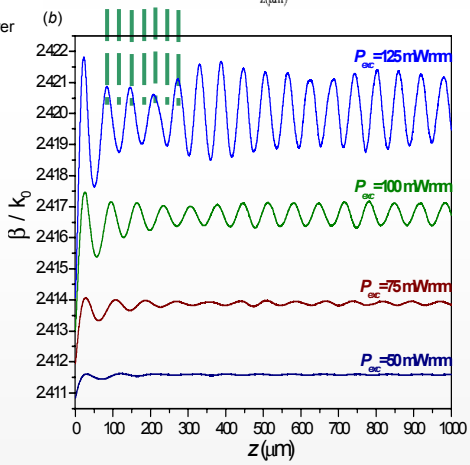


Modal effective index β/k_0 versus laser input power density.

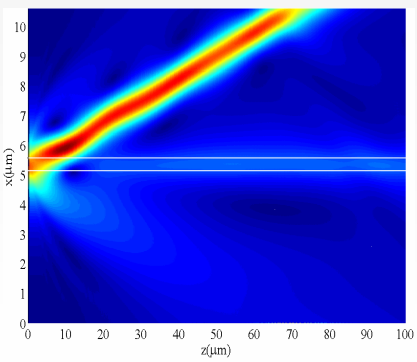


Nonreciprocal phase shift ϕ versus laser input power density.

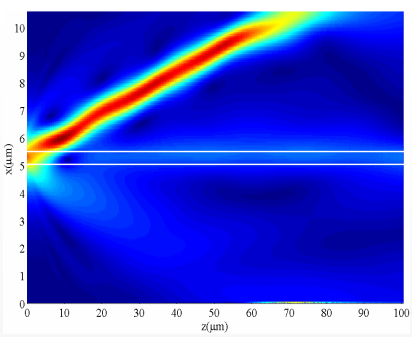




Modal behavior with an increased input power: (a) $|H_y|$ distribution and (b) effective index as a function of the longitudinal direction z. White lines delimit the linear film.



Channel induced in the nonlinear medium. The input power density is 303mW/mm. Parallel lines indicates the film layer.



The same as above, but obtained with FDTD method using Generalized Material Independent PML.