Spatial Solitons in Chiral Media CARLOS GABRIEL AVENDANO, JUAN ADRIAN REYES, Instituto de Fisica, Universidad Nacional Autonoma de Mexico. Apartado Postal 20-364 01000. Mexico, Distrito Federal, Mexico — We study theoretically the nonlinear propagation of a narrow optical wavepacket through a cholesteric liquid crystal. We derive the equations governing the weakly nonlinear dynamics of an optical field by taking into account the coupling with the liquid crystal. We constructed the solution as the superposition of four narrow wavepackets centered around the linear eigenmodes of the helical structure whose corresponding envelopes A are slowly varying functions of their arguments. We found a system of four coupled equations to describe the resulting vector wavepacket which has some integration constants and that under special conditions reduces to the Nonlinear Schrodinger equation with space-dependent coefficients. We solved this equation both, using a variational approach and performing numerical calculations. We calculated analytically, the soliton spatial scales, the transported power, the nonlinear refraction index and its wavelength dependence showing that this has its maxima at the edges of the reflection band. We also exhibit the existence of some other exact but non self-focused solutions.

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