On two coupled nonlinear Schrödinger equations

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The nonlinear Schrödinger equation arises in the study of nonlinear optics in isotropic materials, for instance the propagation of pulses in a single-mode nonlinear optical fiber. However, a single-mode optical fiber is actually bimodal due to the presence of some birefringence effects which tend to split a pulse into two pulses in two different polarization directions. Under various simplifications it is possible to show that the complex amplitudes of the two wave packets in a birefringent optical fiber are governed by a system of two coupled nonlinear Schrödinger (CNLS) equations. In this talk we want to study the Cauchy problem for the following CNLS system with power nonlinearities

$$\begin{cases} i\phi_t + \Delta\phi + (|\phi|^{2p} + \beta|\psi|^{p+1}|\phi|^{p-1})\phi = 0 \\ i\psi_t + \Delta\psi + (|\psi|^{2p} + \beta|\phi|^{p+1}|\psi|^{p-1})\psi = 0 \end{cases}$$

We want to explain some results about local and global existence of solutions, blow-up properties of the system and orbital stability of standing waves. A comparison with some well-known results for the single nonlinear Schrödinger equation will be included.