Wobbling kinks in a two component scalar field theory: Interaction between shape modes

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Abstract: I will talk about the simplest kink solution that arises in the MSTB model, a two component scalar field theory whose potential depends on a parameter. We will first study the spectrum of the first order kink fluctuation, which will allow us to find out that this kink possesses two discrete vibration or shape modes associated with separated vibrations in the first and second components. Then, we will study how the kink behaves when we trigger the second field shape mode using two different perturbation theories. We will find that the excitation of the second shape mode immediately triggers the discrete vibration eigenmode of the first field. We will also find that, when we are away from the kink center, this physical system emits radiation at three different frequencies. We will calculate the decay laws for both shape modes amplitudes and we will be able to verify these results comparing them with the radiation spectra obtained by means of numerical simulations.

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