Transverse stability of the line soliton for wave guide Schrödinger equations.

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The transverse stability has been studied for water-wave equations in the spatial cylinder $\mathbb{R}\times\mathbb{T}$. It consists of studying the stability of the real line standing waves under the 2D flow.

In this talk, we consider the wave-guide Schrödinger equations

$$i\partial_t\psi + \partial_{xx}\psi - |D_y|\psi + |\psi|^{p-1}\psi = 0, \qquad \text{in } \mathbb{R}\times\mathbb{R}\times\mathbb{T},$$

where $1 < p < 5$, $|D_y| := \sqrt{-\partial_{yy}}$ and $\mathbb{T} = \mathbb{R}/2\pi\mathbb{Z}$.

We will show that the transverse stability depends on the frequencies. We will classify the result with respect to a critical frequency and we will provide a threshold. We will discuss also the critical case i.e. when the frequency of the line soliton is equal to the critical one.

This is a joint work with Hiroaki Kikuchi and Slim Ibrahim.