## Some remarks on a biharmonic NLS with mixed dispersion

Antonio J. Fernández
University of Bath, Bath (UK)

### Abstract

Let $\gamma > 0$, $\beta > 0$, $\alpha > 0$ and $0 < \sigma N < 4$. In this talk, for $c > 0$ given, we will address the constrained minimization problem

$$m(c) := \inf_{u \in S(c)} E(u),$$

where

$$E(u) := \frac{\gamma}{2} \int_{\mathbb{R}^N} |\Delta u|^2 \, dx - \frac{\beta}{2} \int_{\mathbb{R}^N} |\nabla u|^2 \, dx - \frac{\alpha}{2\sigma + 2} \int_{\mathbb{R}^N} |u|^{2\sigma+2} \, dx,$$

and

$$S(c) := \left\{ u \in H^2(\mathbb{R}^N) : \int_{\mathbb{R}^N} |u|^2 \, dx = c \right\}.$$

The aim of our study is twofold. On one hand, this minimization problem is related to the existence and orbital stability of standing waves for the mixed dispersion nonlinear biharmonic Schrödinger equation

$$i\partial_t \psi - \gamma \Delta^2 \psi - \beta \Delta \psi + \alpha |\psi|^{2\sigma} \psi = 0, \quad \psi(0,x) = \psi_0(x), \quad (t,x) \in \mathbb{R} \times \mathbb{R}^N.$$

On the other hand, in most of the applications of the Concentration-Compactness principle of P.-L. Lions, the difficult part is to deal with the possible dichotomy of the minimizing sequences. The problem under consideration provides an example for which, to rule out the dichotomy is rather standard while, to rule out the vanishing, here for $c > 0$ small, is challenging. The talk is based in a joint work with Nabile Boussaïd and Louis Jeanjean.