Nonexistence and uniqueness of breathers for modified Zakharov-Kuznetsov models

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Abstract

In this talk we will consider the (focusing) modified Zakharov-Kuznetsov (mZK) in dimension $N \geq 1$:

$$u_t + (\Delta u + 2u^3)_{x_1} = 0,$$

for a given real-valued function $u = u(t,x)$, where $t \in \mathbb{R}$ and $x \in \mathbb{R}^N$. This equation is a special case of the completely integrable modified Korteweg-de Vries (mKdV) equation $u_t + (u_{xx} + 2u^3)_x = 0$. During this talk we will present results related to existence and nonexistence of quasimonochromatic breathers solution for the mZK equation, depending on the dimnesion N. Additionally we will show how the famous breather solution of the mKdV equation represents a unique instance of a quasimonochromatic breathers solution.