Universidade do Minho
Escola de Ciências
Centro de Matemática

Centre of Mathematics, University of Minho

Analisys Seminar

Date and time :: 2012 April 12, 14:30h

Room :: Seminars Room of DMA (B4009), Campus of Gualtar

Speaker :: Jorge Drumont Silva, Center for Mathematical Analysis, Geometry, and Dynamical Systems, IST

Title :: Local and global well-posedness for a perturbation of the critical nonlinear Schrödinger equation

Abstract :: We consider the initial value problem for the Schrödinger-Debye system (SD), which appears in nonlinear optics:

$$\begin{cases} iu_t + \frac{1}{2}\Delta u = uv, & t \geq 0, \quad x \in \mathbb{R}^n, \\ \mu v_t + v = \lambda |u|^p, & \mu > 0, \quad \lambda = \pm 1, \quad p > 0, \\ u(x,0) = u_0(x), \quad v(x,0) = v_0(x), \end{cases}$$

where $u = u(x,t)$ is a complex valued function and $v = v(x,t)$ is a real valued function. We present some recent global well-posedness results for the SD system system with $p = 2$ (physical case), in the energy space $H^1 \times L^2$ and critical dimension dimension $n = 2$. In particular, we show that, unlike the corresponding *limiting model* ($\mu \to 0$) nonlinear Schrödinger equation (NLS):

$$iu_t + \frac{1}{2}\Delta u = \lambda u|u|^p,$$

the SD system is globally well-posed, even in the focusing case ($\lambda = -1$), without any smallness assumption on the intial data.
This is work done in collaboration with Adán Corcho and Filipe Oliveira.