Title: **Evans function methods in the stability analysis of periodic wavetrains**

Speaker: **Ramon Plaza**

This 3-hour lecture series provides an introduction to recent techniques in the spectral stability analysis of spatially periodic travelling waves (also known as "periodic wavetrains") which involve the periodic Evans function introduced by Gardner (1997). I will illustrate the theory and its relation to the (formal) modulation theory of Whitham. We will discuss the following topics

Preliminaries. Floquet-Bloch spectrum:

A review of the definition of spectra for perturbed periodic wavetrains: Floquet spectrum, point spectrum vs. continuous spectrum, Bloch wave decompositions. Definition of the monodromy matrix, Floquet exponents and curves of spectrum.

Introduction to modulation theory:

A panoramic overview of Whitham's modulation theory, averaged Lagrangians, the action method and ellipticity/hyperbolicity of the Whitham system. Computation of the modulational stability index. As examples I will consider the sine-Gordon and KdV equations.

Evans function techniques:

Review of the periodic Evans function, bifurcation of curves of spectrum around the origin and its relation to the formal modulational stability theory of Whitham. Nonlinear Klein-Gordon equations will be used as a paradigm, but the methods apply more generally.

Schedule: Friday 24 november at 15:00-16:30 room 1.7 (Coppito 1) Tuesday 28 november at 15:00-16:30 room A1.7 (Coppito 0)