Publicacions més rellevants de la línia de recerca:

Dinàmica d'ones, mecànica quàntica i modelització matemàtica.

Referència: Aguareles, M., Chapman, S.J. and Witelski, T. Interaction of Spiral Waves in the Complex Ginzburg-Landau Equation. *Physical Review Letters*, **101(224101)** (2008), pp. 1–4.

Abstract: Solutions of the general cubic complex Ginzburg-Landau equation comprising multiple spiral waves are considered, and laws of motion for the centers are derived. The direction of the motion changes from along the line of centers to perpendicular to the line of centers as the separation increases, with the strength of the interaction algebraic at small separations and exponentially small at large separations. The corresponding asymptotic wave number and frequency are also determined, which evolve slowly as the spirals move.

Referència: Pellicer, M. and Solà Morales, J. Optimal decay rates and the selfadjoint property in overdamped systems. *Journal of Differential Equations*, **246** (2009), pp. 2813-2828.

Abstract: We deal with abstract linear strongly damped wave equations. In the so-called overdamped regime we show the occurrence of two interesting phenomena. The first is the existence of an explicit special inner product which makes the problem selfadjoint. The second is an improvement of the decay rate for more regular solutions that will be of an exponential?polynomial type. Furthermore, we prove the optimality of this decay rate.

Referència: Elizalde, E. and Haro, J. Hamiltonian Approach to the Dynamical Casimir Effect . *Physical Review Letters*, **97(130401)** (2006), pp. 1–4.

Abstract: A Hamiltonian approach is introduced in order to address some severe problems associated with the physical description of the dynamical Casimir effect at all times. For simplicity, the case of a neutral scalar field in a one-dimensional cavity with partially transmitting mirrors (an essential proviso) is considered, but the method can be extended to fields of any kind and higher dimensions. The motional force calculated in our approach contains a reactive term proportional to the mirrors' acceleration which is fundamental in order to obtain (quasi)particles with a positive energy all the time during the movement of the mirrors while always satisfying the energy

conservation law. Comparisons with other approaches and a careful analysis of the interrelations among the different results previously obtained in the literature are carried out.