TITLES AND ABSTRACTS

SCIPIO CUCCAGNA

Title: *On asymptotic stability of N-solitons of the Gross-Pitaevskii equation*

Abstract: We consider the integrable Gross-Pitaevskii equation in 1D, which is the cubic defocusing NLS after a simple change of unknown. The asymptotic stability of kink like solutions of this equation have been considered by Bethuel, Gravejat and Smets and by Gravejat and Smets using the theory of Martel and Merle, in the context of energy spaces especially designed for this problem.

In our talk we present our joint paper with Robert Jenkins where we analyzed asymptotic stability, and more generally we proved the soliton resolution, using the framework of the Inverse Scattering Transform, and the asymptotic methods provided by the Nonlinear Steepest Descent Method of Deift and Zhou.

NICOLA GIGLI

Title: The continuity equation on metric measure spaces

Abstract: I will discuss in what sense it is possible to state the continuity equation in the highly non-smooth setting of metric measure spaces and how it can be used to characterize absolutely continuous curves of measures w.r.t. the trasportation distance W_2. This generalizes to spaces with no a priori differential structure results previously available only on R^n or Riemannian/Finslerian manifolds. From a joint work with B. Han.

MATHIEU LEWIN

Title: *Derivation of nonlinear Gibbs measures from many-body quantum mechanics*

Abstract: Nonlinear Gibbs measures have recently become a useful tool to construct solutions to time-dependent nonlinear Schrdinger equations with rough initial data. In this talk I will explain how these measures can be obtained from the corresponding many-particle quantum Gibbs states, in a mean-field limit where the temperature T diverges and the interaction behaves as $1/T$. Our results cover the defocusing nonlinear Schrdinger case on the circle, as well as

smoother interactions in higher dimensions. Joint work with P.T. Nam and N. Rougerie.

FABRICE PLANCHON

Title I: *The wave equation inside strictly convex domains I : a parametrix construction*

Abstract: We will present, on model cases, how one can construct an approximate solution for the wave equation, either by eigenfunction expansions or as a sum over waves localized between two consecutive reflections. Depending on the ratio between the (high) frequency and the distance to the boundary, one may then obtain sharp bounds from one or the other sum, by (degenerate) stationary phase methods. This is joint work with Oana Ivanovici, Richard Lascar and Gilles Lebeau.

Title II: *The wave equation inside strictly convex domains II: from dispersion to Strichartz*

Abstract: In the second part, we explain how the sharp dispersion bounds may be suitably "averaged over" in order to get Strichartz estimates which do not follow trivially from the previously obtained dispersion. This requires subtile improvements to the parametrix itself which may be of independent interest.

GUSTAVO PONCE

Title I: *On the regularity and decay of solutions to the Benjamin-Ono equation.*

Abstract: After reviewing previous results we shall present a recent one (joint work with P. Isaza and F. Linares) describing special regularity properties of solutions to the IVP associated to the Benjamin-Ono equations. In particular, we shall see that for a datum $u_0 \in H^{3/2}(R)$ whose restriction belongs to $H^m((b,\infty))$ for some $b \in R$ and $m \in Z^+$ the corresponding solution $u(\cdot,t)$ belongs to $H^m(\beta,\infty))$ for any $\beta \in R$ and any $t \in (0,T)$. Thus, this type of regularity travels with infinite speed to its left as time evolves. We shall discuss some consequences of these results and their extensions to other nonlinear dispersive models.

MICHELA PROCESI

Title: *Growth of Sobolev norms for the analytic NLS on T^2.*

Abstract: I will discuss some recent results in collaboration with Emanuele Haus and Marcel Guardia. I will consider the analytic non-linear Schrodinger equation on a two-dimensional torus and exhibit orbits whose Sobolev norms grow with time. The main point is to make use of an accurate combinatorial analysis in order to reduce to a sufficiently simple toy model similar in many ways to the one for the cubic NLS

BENJAMIN SCHLEIN

Title: *Effective Equations from Quantum Dynamics.*

Abstract: In this mini-course, we will discuss the derivation of effective evolution equations from first principle many body quantum dynamics. In particular, we will show how the nonlinear Hartree equation, the Hartree-Fock equation and the Gross-Pitaevskii equation approximate the evolution of many body quantum systems in appropriate limiting regimes.