

June 2, 2017, 16:30-18:30

BCAM, Mazarredo 14, 48009 Bilbao, Basque Country, Spain

Elona AGORA

Universidad Nacional de La Plata-CONICET, Argentina

WEIGHTED INEQUALITIES FOR THE HARDY-LITTLEWOOD MAXIMAL OPERATOR

**Abstract:** In this talk we will deal with weighted inequalities for the Hardy Littlewood maximal operator,  $M$ . Recall that:

- (i) The boundedness of  $M$  on Lebesgue spaces  $L^p(u)$  is characterized by the  $A_p$  Muckenhoupt class of weights.
- (ii) The boundedness of  $M$  on classical Lorentz spaces  $\Lambda^p(w)$  is solved by the  $B_p$  class of weights.

Whereas the first problem is solved using techniques from the Calderón-Zygmund theory, the second one requires tools from the theory of rearrangement invariant spaces [5].

The so-called weighted Lorentz spaces  $\Lambda_u^p(w)$ , introduced in [7], generalize  $L^p(u)$  and  $\Lambda^p(w)$  spaces, providing a common framework to study (i) and (ii). The strong-type inequality for  $M$  on  $\Lambda_u^p(w)$  was solved in [4] and [6]. However, the weak-type inequality for  $\Lambda_u^p(w)$  remained open.

The goal of this talk is to discuss the solution to this problem, obtained in [1]. Then, we will relate our results with weighted inequalities for the Hilbert transform. Our techniques are different from the classical cases and so they also provide alternative proofs to the known results. This talk is based on joint works with J. Antezana, M. J. Carro, and J. Soria (see [1], [2] and [3]).

Jorge ANTEZANA

Universidad Nacional de La Plata-CONICET, Argentina

APPLICATIONS OF QUASICRYSTALS IN HARMONIC ANALYSIS

**Abstract:** Quasicrystals are non-periodic structures discovered by Shechtman in 1984, while he was studying materials whose X-ray diffractions spectra present such non-periodic behaviors (see [7]).

Nowadays, one of the best mathematical ways to model quasicrystals are the so called *model sets* introduced by Meyer in [6] many years before the discovery of Shechtman. The aim of Meyer was to study approximation of algebraic characters by continuous ones in locally compact abelian groups (see also [3]).

Recently, important applications of quasicrystals to Fourier Analysis have been found (see [5], [2], [4]). In this talk we will discuss some of these applications, making focus in those related with problems of sampling and interpolation in Paley Wiener spaces.