

## Gómez Díaz Luis Gabriel



Position: EMJD IRAP PH.D Student

Period covered: 2013-2016

### I Scientific Work

#### **Structure Formation and “Inos”**

It has been recently shown that massive keV sterile neutrinos can be candidates to explain the distribution of dark matter in galaxies. It may lead to some possible modifications on the Nonlinear Matter Power Spectrum compared to that for Cold Dark Matter (CDM) paradigm. As a first step, it will be necessary to obtain the density profile for Warm Dark Matter (WDM) halo for such neutrinos, which obey the Fermi Dirac distribution. Based on spherical collapsed model, I will concentrate on structure formation on small scales, of course regarding the effect of linear Power Spectrum generated during the inflationary mechanism and the effect of suppression through the transfer function for WDM. Finally, I will study whether WDM can solve some discrepancies between simulations and recent observations about the halo masses, the so-called “too big to fail problem” and the overproduction of number of satellites in the Milky Way.

### II Conferences and educational activities

#### *II a Conferences and Other External Scientific Work*

- IRAP Ph.D. Erasmus Mundus school “Third Bego Rencontres” 8-19 September 2014- Nice (France).
- 1st Scientific ICRANet Meeting in Armenia: Black Holes: the largest energy sources in the Universe 30 June - 4 July 2014 – Yerevan (Armenia).
- Ecole Internationale Daniel Chalonge Workshop CIAS Meudon 2014: From Large to small scale in agreement with observations: CMB, WDM, Galaxies, Black holes, Neutrinos and sterile Neutrinos. 4-6 June 2014- Observatoire de Paris, Château de Meudon CIAS (France).
- IRAP Ph.D. Erasmus Mundus Workshop: Supernovae, Gamma-ray bursts and the induced gravitational collapse, May 11-16, 2014 - Les Houches (France).
- IRAP-PhD Erasmus Mundus School, “Nice Winter School”: 23 February - 2 March 2014- Nice (France).
- IRAP-PhD Erasmus Mundus School, Nice France: 2-20 September, 2013.