

Workshop CIAS Meudon 2012

A Turning Point in the Research of Dark Matter

WARM DARK MATTER GALAXY FORMATION IN AGREEMENT WITH OBSERVATIONS

PURPOSE AND TOPICS

A Turning Point operated recently in the Dark Matter research: Warm Dark Matter (WDM) emerged impressively over Cold Dark Matter (CDM) as the leading Dark Matter candidate. WDM solves naturally the problems of CDM and agrees with the observations at small as well as large and cosmological scales.

1: Conceptual context: Dark Matter in cosmology and astrophysics: perspective and prospective of the research in the subject: Theory and observations. The emergence of Warm (keV scale) Dark Matter from theory and observations.

2: Astronomical observations : galaxy structural properties, the universal and non universal properties of galaxies, high quality rotation curves, kinematics, density profiles, gravitational lensing, small and large structures, deep surveys and clusters of galaxies.

3: Numerical simulations with Warm Dark Matter, large structures, structures and substructures.

Special attention will be payed to the astrophysical understanding of the dark matter problems, the use of analytic and numerical methods which determine the properties, the distribution and the nature of Warm Dark Matter.

TOPICS

- Kinetic theory and the recent progress in solving the Boltzmann-Vlasov equation to obtain the observed universal properties of galaxies. N-body numerical simulations with Warm dark Matter.
- The dark matter surface density in galaxies.
- The phase-space density of dark matter.
- Particle model independent analysis of astrophysical dark matter.
- The impact of the mass of the dark matter particle on the small scale structure formation and the choice of the initial conditions.
- The radial profiles and the Dark Matter distribution. Observed cored DM profiles.
- The keV scale Dark Matter (Warm Dark Matter): Observational and theoretical progresses.
- Large and small scale structure formation in agreement with observations at large scales and small (galactic) scales.
- The new serious dark matter candidate: Sterile neutrinos at the keV scale.

Support to the James Webb Space Telescope

SOC AND LOC

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