COST Meeting CA 15117 CANTATA *Programme*				
	Tuesday 19 March 2019	**Wednesday 20 March 2019**	**Thursday 21 March 2019**	**Friday 22 March 2019**
Topic of the Day *Chairperson and Moderator*	**Observational tensions** (WG3) *Vincenzo Salzano*	**Cluster and galactic dynamics** (WG2) *Mariafelicia de Laurentis*	**Gravitational building blocks** (WG1) *Prado Martín-Moruno*	**White Paper** *Emmanuel N. Saridakis*
09:30-10:00	**Yashar Akrami** *Testing gravity with Stage IV cosmological surveys*	**Anne-Christine Davis** *Two Body Problem in Scalar-Tensor Theories of Dark Energy*	**José Beltrán Jiménez** *On sensible roads towards modifications of gravity*	Discussion on the White Paper
10:00-11:00	Discussion 1	Discussion 1	Discussion 1	
11:00-11:30	**Coffee Break**			
11:30-12:00	**Stefano Casertano** *The 4-sigma tension in the Hubble Constant: Local measurements and cosmology*	**Ippocratis D. Saltas** *Testing GR with galaxy-cluster mass profiles*	**Lavinia Heisenberg** *The Landscape and the Swampland*	Discussion on the White Paper
12:00-13:00	Discussion 2	Discussion 2	Discussion 2	
13:00-14:30	**Lunch Break**			End of the Meeting
14:30-15:00	**José María Ezquiaga** *Testing gravity with standard sirens: challenges and*		**Philippe Brax** *Why do we want to modify gravity?*	

	opportunities			
15:00-15:30	Discussion 3	**Benoit Famaey** *Galactic scaling relations: emergent or fundamental?*	Discussion 3	
15:30-16:00		Discussion 3		
16:00-16:30	Final discussion		Final discussion	
		Final discussion		

ABSTRACTS

Speaker: **José Beltrán**
Title: *On sensible roads towards modifications of gravity*

Abstract: General Relativity has recently turned 100 years old and it still provides the most successful theory for the gravitational interaction. This however does not preclude exploring modifications which are generally motivated by theoretical (UV incompleteness, existence of singularities, etc.) and phenomenological (dark energy, dark matter, inflation, etc.) considerations. In this talk I will review the fundamental building blocks of General Relativity from an effective field theory and how this approach leads to the possibility of interpreting gravity in geometrical terms. In this respect, I will show the three equivalent geometrical interpretations of General Relativity. From both perspectives I will discuss how to go beyond General Relativity either by adding additional fields or by modifying the geometrical structure of the theory, paying special attention to the perils of each road both from a theoretical and phenomenological viewpoints.

Speaker: **Stefano Casertano**
Title: *The 4-sigma tension in the Hubble Constant: Local measurements and cosmology*

Abstract: The value of the Hubble constant, as determined in the local universe, is significantly larger than the value inferred from CMB measurements combined with a Lambda-CDM cosmology. Recent results from both HST and Gaia have improved the local measurements, and upcoming studies promise to bring the local H0 uncertainty below the 2% mark (including a broad range of systematics); our group's goal is to approach 1% uncertainty within five years. The tension between local and cosmological values of the Hubble Constant is now about 4-sigma. The internal consistency and stability of both sets of measurements appear very solid. Therefore the resolution of this tension may well reside in new physics,

potentially causing deviations from the standard Lambda-CDM cosmology. Many viable suggestions have been offered to date, but none has emerged yet as a preferred model.

Speaker: **José María Ezquiaga Bravo**
Title: *Testing gravity with standard sirens: challenges and opportunities*

Abstract: Multi-messenger gravitational wave astronomy offers exciting new avenues to test Einstein's theory of gravity. In this talk I will review what we could learn about gravity using standard sirens. In particular, I will focus on tests of the propagation speed, the GW luminosity distance and additional polarizations. I will summarize recent results from the first two runs of LIGO and outline the prospects of a future network of ground-based detectors and space-based interferometers. Throughout the talk, I will highlight different challenges and opportunities of this field.

Speaker: **Benoit Famaey**
Title: *Galactic scaling relations: emergent or fundamental?*

Abstract: In this talk, I will review the observational evidence for an intimate connection between the baryonic surface density and the total gravitational field in galaxies. This observational fact presents a fine-tuning problem for the particle dark matter interpretation of mass discrepancies in galaxies. I particular, it leads to a too high "diversity" of rotation curve shapes for a given mass. On the other hand, this phenomenology is naturally explained in a paradigm hypothesizing an effective breakdown of Newtonian dynamics in the extremely low acceleration regime (MOND). However, MOND predictions break down on scales larger than galaxies. Theories modifying the lagrangian of the dark matter sector to account for the observed phenomenology in galaxies while preserving the predictions of the standard cosmological model on the largest scales are perhaps a promising way to reconcile these conflicting observational facts. I will present some tentative dark matter models which seem to fit the bill, as well as their current shortcomings.

18 March 2019