	Monday, 7	Tuesday, 8	Wednesday, 9	Thursday, 10
	DAY 1	**DAY 2**	**DAY 3**	**Outreach Training Session**
Chairperson	*TBA*	*TBA*	*TBA*	*Gonzalo Olmo*
8:45-9:30	**Registration**			
9:30-10:00	**Emmanuel Saridakis** *Constraining cosmological models through gravitational waves observations*	**Jutta Kunz** *Compact objects in gravity theories*	**Manuel Hohmann** *Viability of teleparallel gravity from solar system tests*	**Kim Holmberg** *New forms of scholarly communication and altmetrics*
10:00-11:00	Discussion 1	Discussion 1	Discussion 1	
11:00-11:30	Coffee Break			
11:30-12:00	**László Á. Gergely** *Black hole perturbations in effective field theories of modified gravity*	**Gonzalo J. Olmo** *Exotic Compact Objects in Ricci-Based Gravity Theories*	**Nicoleta Voicu** *The why and how of Finsler field theory*	**TBA**
12:00-13:00	Discussion 2	Discussion 2	Discussion 2	
13:00-14:30	Lunch Break			End of the meeting
14:30-15:00	**Salvatore Capozziello** *Cosmographic reconstruction to discriminate between*	**Ana Alonso Serrano** *Black hole evaporation: Entropy analysis and*	**Tomi Koivisto** *Energy and entropy in General Relativity*	

	modified gravity and dark energy	*GUP corrections*		
15:00-16:00	Discussion 3	Discussion 3	Discussion 3	
16:00-16:30	Final discussion	Final discussion	**Eduardo Guendelman** *Absence of the Fifth Force Problem in a Model with Spontaneously Broken Dilatation Symmetry*	
16:30-17:00			Final discussion	

Speaker: Ana Alonso Serrano
Title: *Black hole evaporation: Entropy analysis and GUP corrections*
Abstract: In this talk I review the analysis of the information budget in black hole evaporation, starting by showing the standard case 0f the infomation budget in blackbody radiaton. When this process is unitary, the entropy is exactly compensated by the "hidden information" in the correlations that one chooses not to consider within the specific selected coarse-graining. In addition, the entropy budget should be corrected at last stages of evaporation, due to quantum gravity effects. I introduce a phenomenological quantum gravity approach that allow us to determine the modifications in the Hawking flux when one approaches the Planck size.

Speaker: Salvatore Capozziello
Title: *Cosmographic reconstruction to discriminate between modified gravity and dark energy*
Abstract: Cosmography is a model independent approach, useful to discriminate among concurring cosmological scenarios. After reviewing the main features and shortcomings of LCDM model, we propose a cosmographic approach, based on some polynomial series like Pade', Chebyschev, etc. to investigate dark energy and modified gravity. The main result is that series convergence seems a powerful tool to extend the matching with the Hubble flow up to high redshift and then improve the role of observers in Cosmology.

Speaker: László Á. Gergely
Title: *Black hole perturbations in effective field theories of modified gravity*
Abstract: Motivated by situations with temporal evolution and spatial symmetries

both singled out, we developed a new 2 + 1 + 1 decomposition of spacetime, based on a nonorthogonal double foliation. The gravitational variables in the velocity phase-space are the 2 +1 decomposed spatial metric (the 2-metric on the intersection $\Sigma_{t\chi}$ of the hypersurfaces of the foliations, the 2 + 1 components of the spatial shift vector), complemented by geometric quantities characterizing the embedding (the extrinsic curvature, normal fundamental form and normal fundamental scalar of $\Sigma_{t\chi}$, all constructed with the normal to the temporal foliation). We apply the formalism for the perturbations of the spherically symmetric, static black holes in beyond Horndeski theories by analyzing an effective field theory type action. The first order perturbations in these variables lead to the background equations of motion. Second order perturbations lead to the dynamics of perturbations, decomposed into even and odd sectors. We present an unambiguous gauge fixing closely resembling the Regge-Wheeler gauge of general relativity. Then we discuss the stability of perturbations, establishing constraints on the functional dependence of the Lagrangian.

Speaker: Eduardo Guendelman
Title: *Absence of the Fifth Force Problem in a Model with Spontaneously Broken Dilatation Symmetry*
Abstract: A scale invariant model containing dilaton ϕ and dust (as a model of matter) is studied where the shift symmetry $\phi \rightarrow \phi$+const. is spontaneously broken at the classical level due to intrinsic features of the model. The dilaton to matter coupling "constant" f appears to be dependent of the matter density. In normal conditions, i.e. when the matter energy density is many orders of magnitude larger than the dilaton contribution to the dark energy density, f becomes less than the ratio of the "mass of the vacuum" in the volume occupied by the matter to the Planck mass. The undesirable 5th force of quintessence scenarios is therefore largely suppressed.

Speaker: Kim Holmberg
Title: *New forms of scholarly communication and altmetrics*
Abstract: Scholarly communication is changing as researchers increasingly use social media to discover new research opportunities, discuss research with colleagues, and disseminate research information. As scholarly communication is breaking out from its closed ivory towers and with increasing demands for open science, the public can also take part in the online discussions and share the research outputs to their online networks. These online events around scientific outputs (e.g., articles, datasets, code), whether generated through the actions of faculty or the public, leave digital traces that can be tracked and harvested. Altmetrics is the research field that proposes to investigate mentions of scientific articles and other types of events around various research outputs from online sources, such as various social media sites, news outlets, and blogs, with the assumption that the results could ascertain new insights about these new forms of scholarly communication and potentially be used for research evaluation. In this presentation I will talk about new forms of scholarly communication, the opportunities they offer for researchers to communicate about their research, and how the online traces these communication leave can potentially be used for research assessment.

Speaker: Manuel Hohmann
Title: *Viability of teleparallel gravity from solar system tests*
Abstract: During the last decade, teleparallel theories of gravity have received growing interest as possible contender theories to resolve open questions in cosmology, as well as to provide a formulation of gravity theory which has more similarities with other field theories. An important question arising from these studies is the viability of such theories on smaller scales, such as the solar system, and the possibility to derive constraints from experiments. Such constraints are commonly obtained in a post-Newtonian limit. In my talk I show how to derive the post-Newtonian limit of a number of teleparallel theories which are relevant in cosmology, including the well-known f(T) and scalar-torsion models, and discuss their viability.

Speaker: Tomi Koivisto
Title: *Energy and entropy in General Relativity*
Abstract: A unified quadratic action for a flat affine connection is presented and shown to reduce to the symmetric and the metric teleparallel equivalents of General Relativity in specific gauges. Since the gauge symmetry is broken by matter, the minimal coupling principle can distinguish a preferred, "physical" geometry. Based on this, the energy-momentum and the entropy of gravitating systems have been finally calculated uniquely in covariant terms.

Speaker: Jutta Kunz
Title: *Compact objects in gravity theories*
Abstract: Compact objects such as black holes and neutron stars allow to study the effects of strong gravity and thus to test Einstein's theory of general relativity and its contenders by comparison with observations, since alternative theories of gravity may lead to distinct features of black holes and neutron stars, like hair or spontaneous scalarization. Quasi-normal mode analysis of these compact objects allows to make contact with gravitational wave observations.

Speaker: Gonzalo J. Olmo
Title: *Exotic Compact Objects in Ricci-Based Gravity Theories*
Abstract: After a brief review of the basic reasons that motivate exploring other theories of gravity beyond GR, I will focus on the particular framework of metric-affine theories and the predictions of some specific models. In this context we will see that different kinds of exotic compact objects whose astrophysical properties are similar to those of standard black holes may arise. Nonetheless, some of them possess novel features that may be relevant for the understanding of singularities and other conceptual issues.

Speaker: Emmanuel Saridakis
Title: *Constraining cosmological models through gravitational waves observations*
Abstract: We review various cosmological scenarios aiming to provide the framework for realizing inflation and/or late-time universe acceleration, and we present the usual ways of data use in order to elaborate them. Then we analyze the recent possibility of using multi-messenger astronomy, namely data from gravitational waves observations alongside their electromagnetic

counterparts, in order to investigate and constrain cosmological models.

Speaker: Nicoleta Voicu
Title: *The why and how of Finsler field theory*
Abstract: As a solid mathematical basis for a Finsler-based field theory, was, up to now, missing, we propose a framework which makes it possible to construct well-defined Finsler gravity actions. This includes a definition of Finsler spacetimes ensuring that both the cone structures and the geodesic structures are well-behaved, together with the construction of a configuration bundle whose sections are (homogeneous) Finsler functions - and which allows us to apply classical variational calculus techniques. This configuration bundle sits over the positive projective tangent bundle of the spacetime manifold.
Further, we construct a concrete vacuum action, starting by an argument by Pirani and using the variational completion algorithm. Variation of this action with respect to the Finsler function turns out to lead to a scalar equation already proposed in 2011 by Pfeifer and Wohlfarth - this time, found out from different arguments and having filled the missing pieces in mathematical rigor. In the particular case of Lorentzian metrics, this scalar equation becomes equivalent to the set of vacuum Einstein equations. Finally, coupling to matter is discussed for compactly supported Finslerian fields; an example of such a field naturally arises in the kinetic theory of gases and is represented by the 1-particle distribution function.