Research Training Group
Graduiertenkolleg
Models of Gravity

RTG Models of Gravity – Online Colloquium	
Date:	25.11.2020
Time:	9:15 - 12:00 and 14:00 - 15:00 CET
Location:	Bremen/Online ZOOM link https://uni-bremen.zoom.us/j/98631263574?pwd=bWE5OFhSSEdkbWdiaUVHVklPUnZkQT09 Meeting-ID: 986 3126 3574 Kenncode: JwkEC5

Program	
09:30 – 10:30	**Sergey V. Ketov** ***(Tokyo Metropolitan University and Kavli IPMU, Japan)*** *Models of supergravity for inflation, primordial black holes and gravitational waves* Basic (Starobinsky) inflationary model is reviewed as the theoretical probe of a more fundamental theory of gravity. Modified supergravity is introduced as an example of such theory towards a deeper understanding of cosmological inflation and (possible) formation of primordial black holes in the early Universe. Specific models are proposed and investigated in detail. Their observational predictions (including black hole masses, dark matter and induced gravitational waves) are derived and compared to the current and future astrophysical and cosmological observations.
10:30 – 11:00	*Coffee Break*
11:00 – 12:00	**Christophe LePoncin-Lafitte *(SYRTE, Paris)*** *Testing General Relativity and searching Dark Matter with clocks* One way to test general relativity is to use high-precision clocks, whether on the ground or in space. More generally speaking, all experimental devices based on the use of frequency difference measurements are useful, which is the case for clocks but also for ultra-stabilised lasers. We will review the various recent results in this field, with a special focus on the Galileo satellites and the ACES space mission. Finally, we will open the discussion on the dark matter search thanks to ground oscillators.

12:00 – 14:00	*Lunch Break*
14:00 – 15:00	**Nicoleta Voicu** ***(Transilvania University Brasov)*** *Variational completion of differential equations and modified theories of gravity* Given a non-variational system of differential equations, we propose a way of turning it into a variational one, by adding a correction term. Such a correction term can be canonically obtained from the coefficients of the given equations, using the so-called Vainberg-Tonti Lagrangian - and it also serves as a most practical way of checking whether the initial PDE system is variational or not. A first application of this algorithm is given by general relativity, where the Einstein tensor is obtained as a canonical variational completion of the Ricci tensor; but, of course, its full force is shown in modified theories of gravity. We present here two such examples, Finsler gravity and 4D Gauss-Bonnet gravity.