



General Mathematics Seminar (GMS)

of the University of Luxembourg

in cooperation with the Luxembourg Mathematical Society

Thursday 1st of February 2018, 4 pm

Maison du Nombre, MNO 1.040

Dr. Rodrigo Vargas Le-Bert (University of Camerino, Italy)

Rodrigo Vargas Le-Bert is a postdoctoral researcher at Università di Camerino, Italy. His work is motivated by the desire to better understand our fundamental models of nature. He has made contributions in the areas of repeated interaction quantum systems, integrability of involutive algebra representations, and the geometry of non-integrable Lie algebra representations. More recently, he has turned to constructive field theory, where he is developing a projective approach to functional integration with applications in stochastic analysis and quantum field theory.

After his studies in Santiago de Chile, New York and Paris, Rodrigo obtained his PhD in Grenoble. Later, he worked as CONICYT postdoctoral fellow at Universidad de Talca and associate professor at Universidad Austral, both in Chile.



Renormalization theory & the density functionals for a continuous product measure

In both statistical and quantum physics, one is interested in the construction of certain measures on spaces of fields. Famously, a naive approach to these infinite dimensional measures is plagued by divergences, and this has gradually come to be physically understood in terms of a multiscale analysis known as renormalization theory. The entailing conceptual understanding, however, has not yet been paralleled by a mathematical theory which is able to provide us with the relevant measures for the description of the world we inhabit (rigorous models have only been constructed in spatial dimensions 1 and 2). In this talk, I will introduce renormalization theory using a new approach, based on incorporating the fact that the space-time continuum is an idealization by using a projective limit description of the space of functions on a manifold. This leads immediately to the concepts of continuous product measures and Lévy white noise fields. It also allows for a clean and simple generalization of the Wick calculus in stochastic analysis and quantum field theory, which works seamlessly for non-gaussian measures on spaces of fields over arbitrary manifolds. Finally, I will demonstrate how this approach promises to solve the problems mentioned above, by constructing several reasonable candidates for non-trivial scalar field theories in arbitrary space-time dimension.

Coffee and cookies: 15:40 on the 6th floor of the MNO, in the kitchen corner of maximal distance to the elevator (From the elevator, you can enter only one door, and then you will pass by a small kitchen corner. Please continue until you arrive at a bigger kitchen corner).

Time and place of the talk: 16:00 (4 p.m.) in the Maison du Nombre, MNO 1.040.

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