

MP 3: Quantum Field Theory II

Time: Tuesday 11:00–12:30

Location: HSZ/0304

Invited Talk MP 3.1 Tue 11:00 HSZ/0304
Renormalization of singular stochastic partial differential equations — ●PAWEŁ DUCH — Adam Mickiewicz University, Poznan, Poland

Stochastic PDEs, i.e. partial differential equation with random terms or coefficient, play an important role in mathematical physics and have applications in areas such as quantum field theory, statistical mechanics and material science. Well-known examples of stochastic PDEs are the KPZ equation describing the motion of a growing interface or the stochastic quantization equation of the Φ^4 Euclidean QFT. Most of the interesting non-linear stochastic PDEs, including the ones mentioned above, are too singular to admit classical treatment. Solving such equations poses a formidable challenge and usually requires the regularization and renormalization of the equation.

After giving a brief overview of the tremendous progress in the area of singular stochastic PDEs in the past decade, I will present a novel approach to such PDEs proposed in my recent work. The approach uses the framework of the Wilsonian renormalization group theory and is based on a certain flow equation that plays an analogous role to the Polchinski equation in QFT. The approach allows to solve a large class of singular stochastic PDEs in a systematic manner and avoids alge-

braic and combinatorial problems arising in different approaches.

Invited Talk MP 3.2 Tue 11:30 HSZ/0304
Integral decomposition of modular operators in QFT — HENNING BOSTELMANN¹, ●DANIELA CADAMURO², and KO SANDERS³ — ¹Department of Mathematics, University of York, UK — ²Institute for Theoretical Physics, University of Leipzig, Germany — ³Department of Mathematics, FAU Erlangen-Nürnberg

The Tomita-Takesaki modular operator of local algebras (or, in linear field theories, of standard subspaces) is a structurally important concept in quantum field theory; unfortunately little can be said about its explicit form in most concrete situations. We develop a general decomposition theory for standard subspaces along direct integrals, making some new examples available to explicit treatment.

Invited Talk MP 3.3 Tue 12:00 HSZ/0304
Emergence of gravity from conformal field theory — ●NELE CALLEBAUT — Institute for Theoretical Physics, University of Cologne

I will discuss several mechanisms by which gravity emerges from conformal field theory: through holography, entanglement dynamics or irrelevant deformations.