

# A variational method for Euclidean quantum fields

Massimiliano Gubinelli<sup>1</sup>

<sup>1</sup> Universität Bonn

The  $\Phi_3^4$  measure is one of the paradigmatic examples of interacting Euclidean quantum field theories. Formally it is given by a Gibbsian perturbation of the 3d massive Gaussian free field via a local polynomial potential of degree four. Due to the small scale irregular behaviour of the free field its definition requires a renormalization procedure. I will describe an explicit formula for the Laplace transform of the  $\Phi_3^4$  measure on a periodic domain. In order to establish such formula we combine tools from the theory of singular SPDEs with stochastic optimal control and Gamma convergence. (joint work with N. Barashkov)