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Euclidean field theories as limit of interacting Bose gases

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Euclidean field theories have been extensively studied in the mathematical literature since the sixties, motivated by high-energy physics and statistical mechanics. Formally, they can be described by Gibbs measures associated with Euclidean action functionals over spaces of distributions. In the latest years it has been shown how such theories emerge as high-density limit of interacting Bose gases at positive temperature, giving a rigorous derivation from a realistic microscopic model of statistical mechanics.

In this talk, I will present a recent result providing the derivation of such a field theory, hence of the invariant Gibbs measure, with a quartic local interaction in two dimensions as a limit of an inhomogeneous interacting Bose gas. Based on joint work with Antti Knowles, Alessio Ranallo and Pedro Torres Giesteira.

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