The use of scattering theory for the resolution of a conformal field theory

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Using scattering theory, we will explain the spectral resolution of a certain Schrödinger operator acting on L^2 functionals over the space of fields on the unit circle (i.e on the Hilbert space $L^2(H^{-s}(\mathbb{S}^1))$) for some essentially Gaussian measure and s > 0).

The difficulty lies in the fact we are working in an infinite dimensional setting and that the potential is

very irregular. This completeness result allows us to express the n-point correlation functions in terms of 3-point correlation functions for the so-called « Liouville conformal field theory », in a method called conformal bootstrap, developed in physics for general CFT's in the 80's. This gives a first complete mathematical resolution of a non-trivial 2-dimensional conformal field theory combining scattering theory and probability methods.

This is joint work with Kupiainen, Rhodes and Vargas.