Einladung zum
Oberseminar Stochastik

Donnerstag, 5.05.2022 um 17:45 Uhr, im Seminarraum 1 (Raum 005)

der Abteilung Mathematik, Weyertal 86-90, 50931 Köln, spricht:

Titus Lupu
(Sorbonne Université)

zum Thema

Multiplicative chaos of the 2D Brownian loop soup

Abstract

It is known from the works in Mathematical Physics that the continuum Gaussian free field (GFF) admits representations in terms of occupation measures of Brownian trajectories. In particular, the square of the GFF (suitably renormalized) has the same distribution as the occupation measure of a Poisson point process of Brownian loops, known as the Brownian loop soup. This is the Le Jan's isomorphism theorem. The Brownian loop soups come with an intensity parameter $\Theta > 0$, and the connection to the GFF is for the particular parameter $\Theta = \frac{1}{2}$. In our work we related the theory of the Gaussian Multiplicative Chaos (GMC) in 2D (renormalized exponential of the 2D continuum GFF, also appearing in Liouville field theory) to the 2D Brownian loop soup. Actually we constructed a so called multiplicative chaos of the Brownian loop soup for every intensity parameter Θ. Compared to the multiplicative chaos of a single 2D Brownian trajectory, which has been first constructed by Bass, Burdzy and Khoshnevisan in the 90s, in our work we require an additional layer of renormalization due to ultraviolet divergence in the Brownian loop soup. For the particular parameter $\Theta = \frac{1}{2}$, our multiplicative chaos of the Brownian loop soup has the same distribution as the renormalized hyperbolic cosine of the GFF, i.e. is a sum of two GMCs. For other intensity parameters Θ we obtain new non-Gaussian multiplicative chaoses, which satisfy moreover a covariance property under conformal transformations of the domain. This is joint work with Elie Aïdekon (Sorbonne Université/Fudan University), Nathanael Berestycki (University of Vienna) and Antoine Jégo (University of Vienna).

Alle Interessenten sind herzlich eingeladen.

Die Dozenten der Stochastik