



北京理工大学

数学与统计学院学术报告

Global dynamics and weak universality for the fractional hyperbolic ϕ_3^4 -model

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摘要： In this talk, I consider the 3-dimensional stochastic damped fractional nonlinear wave equation (with order $\alpha > 1$) with a cubic nonlinearity, also known as the fractional hyperbolic ϕ_3^4 -model. The construction of the fractional ϕ_3^4 -measure (Gibbs measure for the fractional hyperbolic ϕ_3^4 -model) exhibits a phase transition: when $\alpha > 9/8$, the Gibbs measure is equivalent with the base Gaussian measure; when $1 < \alpha \leq 9/8$, the Gibbs measure is mutually singular with the base Gaussian measure. I will first talk about global well-posedness of the fractional hyperbolic ϕ_3^4 -model and invariance of the fractional ϕ_3^4 -measure for the entire range $\alpha > 1$. Then, I will discuss weak universality for the fractional hyperbolic ϕ_3^4 -model. In the case $\alpha > 9/8$, we prove weak universality by using a first order expansion, invariance of Gibbs measures, and space-time analysis. In the case $1 < \alpha \leq 9/8$, we also obtain weak universality by overcoming the issue of singularity between the Gibbs measure and the base Gaussian measure.

Some parts of the talk are based on a joint work with Nikolay Tzvetkov (ENS Lyon) and Yuzhao Wang (University of Birmingham).