



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Analysis and PDE Seminar

August 31, 2022
3:00 p.m. - 4:00 p.m.
PH 385

Invariant Gibbs measures for the three-dimensional cubic nonlinear wave equation.

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Abstract. In this talk, we prove the invariance of the Gibbs measure for the three-dimensional cubic nonlinear wave equation, which is also known as the hyperbolic Φ_3^4 -model. This result is the hyperbolic counterpart to seminal works on the parabolic Φ_3^4 -model by Hairer '14 and Hairer-Matetski '18. In the first half of this talk, we illustrate Gibbs measures in the context of Hamiltonian ODEs, which serve as toy-models. We also connect our theorem with classical and recent developments in constructive QFT, dispersive PDEs, and stochastic PDEs. In the second half of this talk, we give a non-technical overview of the proof. As part of this overview, we first introduce a caloric representation of the Gibbs measure, which leads to an interplay of both parabolic and hyperbolic theories. Then, we discuss our para-controlled Ansatz and a hidden cancellation between sextic stochastic objects. This is joint work with Y. Deng, A. Nahmod, and H. Yue.