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FAKULTÄT  
FÜR MATHEMATIK, INFORMATIK  
UND NATURWISSENSCHAFTEN

Fachbereich Mathematik

# Kolloquium über Mathematische Statistik und Stochastische Prozesse

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## **Nonparametric Bayesian drift estimation for multidimensional diffusions**

**Abstract:** We consider the problem of estimating the drift and invariant measure of a periodic multidimensional diffusion based on continuous observations, a model used for instance in molecular dynamics. Placing a high dimensional Gaussian prior on the drift, we obtain convergence rates for the posterior distribution and maximum a posteriori (MAP) estimate, which equals a penalized least squares estimator. For dimension at most 3, we also obtain Bernstein-von Mises type results for the posterior distributions of both the drift and invariant measure. This provides a frequentist justification for the Bayesian approach in this model, including for uncertainty quantification.

This is joint work with Richard Nickl.

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