



Wir laden Sie sehr herzlich ein zu einem Vortrag im Rahmen des
Oberseminars Stochastische Analysis:

Dr. Mazyar Ghani Varzaneh
(Fernuniversität Hagen)

*“Dynamical behavior of partial differential equations with
multiplicative rough noise”*

Dienstag, 30. Januar 2024

Beginn: **15.15 Uhr**

Raum: **F426**

Interessenten sind herzlich willkommen!

A. Blessing, R. Denk, M. Kunze, M. Kupper

Abstract: Stochastic partial differential equations perturbed by the multiplicative noise are a family of interesting equations studied by researchers from different aspects. However, only a few results exist for the dynamical behavior of these equations. The main obstacle is that *the Kolmogorov continuity theorem* cannot be applied to these equations. Only in some exceptional cases can some transformations settle this problem. An alternative way to deal with this family of equations is to define the solution path-wise using the *rough path theory*. This approach has many advantages, including solving the problems path-wise and working with the equations perturbed by more irregular noises, including the fraction Brownian motions. However, controlling the priori bounds for the corresponding solutions is challenging. In particular, for analyzing the long-time behavior of the solutions of these equations, we must apply some techniques from the ergodic theory, which require certain integrability assumptions. In this talk, we show that for the Gaussian measures, the above mentioned challenges can be settled when its corresponding *Cameron-Martin* space meets certain assumptions. These assumptions, in particular, can be verified for the interesting Gaussian processes, including the fraction Brownian and Brownian motions. We then show how we can prove the existence of the invariant manifolds (stable, center, and unstable) for this family of equations. In particular, this theory can easily yield several exponential stability results.