

**Joint Condensed Matter
and Center for Soft Matter and
Biological Physics Seminar**

Dr. Sascha Wald

(Coventry University, UK)

"Non-equilibrium Dynamics in Many-Body Quantum Systems"

Monday, January 25, 2021

4:00pm – 5:00pm

Virtual Meeting:

Zoom Link: <https://virginiatech.zoom.us/j/84912599049>

We study dynamical transition phenomena in analytically solvable many-body quantum systems. Here, we focus on the quantum spherical model and other closely related models that have proven to be a valuable tool for the study of universal properties where one would usually strictly employ numerical methods. We show how the external constraints that define these models can induce surprisingly rich dynamical behavior, such as chaotic phases and freezing-by-heating transitions, on relatively simple single-body systems. We then discuss a naive Lindblad approach to the many-body dynamics and we pinpoint the shortcomings of such an approach. To overcome these problems, we present a physical motivation of how to formulate sensible many-body quantum dynamics using quantum Langevin equations and we apply this type of dynamics to quench problems in the quantum spherical model.