



# Spectral Theory and Dynamics of Quantum Systems

GRADUIERTENKOLLEG 1838

## Stuttgart-Tübingen GRK-Seminar

19. Juli 2018

Universität Stuttgart

Raum Seminar: 8.122, Pfaffenwaldring 57

Programm		
14:00 – 14:25	Lenon Minorics	Some Limit Theorems for the Laplacian on Statistically Self-Similar Cantor Strings
14:30 – 14:55	Tim Ehnes	Stochastic Wave Equations defined by Fractal Laplacians on Cantor-like Sets
15:00 – 15:25	Daniela Maier	Breather-Lösungen auf einem diskreten, periodischen Graphen
Kaffeepause		
16:00	Mathematisches Kolloquium	
ab 18:00	Nachsitzung	

**Mathematisches Kolloquium:**

### On the qualitative behavior of nonlinear dispersive systems

**Apl. Prof. Dr. Wolf-Patrick Düll**

**ABSTRACT:** In many physical systems dispersion plays an important role, which means that waves of different wavelengths travel at different speeds. If the systems are nonlinear, it is possible that concentration effects balance dispersive effects such that structures of permanent form like traveling pulses can be observed. In this talk, we explain how this phenomenon can be modeled with the help of partial differential equations. We present the two most famous nonlinear dispersive differential equations, namely the Korteweg-de Vries equation and the Nonlinear Schrödinger equation, and show that these equations can be formally derived as approximation equations to describe the dynamics of complicated nonlinear dispersive systems. To understand to which extent these approximations yield correct predictions of the qualitative behavior of the original systems it is important to justify the validity of the approximations by estimates of the approximation errors in the physically relevant length and time scales. Therefore we discuss strategies for proving such error estimates, which is a highly nontrivial problem if the original systems are quasilinear.