



## SFB-Seminar (Teilprojekt C1 & Teilprojekt C4)

### ZEIT:

12.10.2015, 15:00 Uhr - 17:30 Uhr

### ORT:

### PROGRAMM:

15:00 - 16:00 **Prof. Dr. Karen Vogtmann (University of Warwick)**

#### **Cycles in moduli spaces of graphs**

Finite metric graphs parameterize many phenomena in mathematics and science, so we would like to understand spaces which parameterize such graphs, i.e. moduli spaces of graphs. Moduli space of graphs with a fixed number of loops and leaves often have interesting topology that is not at all well understood. For example, Euler characteristic calculations indicate a huge number of nontrivial homology classes, but only a very few have actually been found. I will discuss the structure of these moduli spaces, including recent progress on the hunt for homology based on joint work with Jim Conant, Allen Hatcher and Martin Kassabov.

16:00 - 16:30 Kaffee-Pause

16:30 - 17:30 **Prof. Dr. Spencer Bloch (University of Chicago)**

#### **Vanishing cycles and monodromy for physical amplitudes**

Amplitudes are multiple-valued analytic functions of external momenta in perturbative quantum field theory. The basic local monodromy structure of amplitudes was already understood by physicists (Laudau, Cutkosky, and others) by the 1960's. Important progress in uniting the physics with the corresponding mathematical theory of vanishing cycles was made by Pham at about the same time, but somehow the story was never completed. I will discuss joint work with D. Kreimer on this topic. In particular, I will explain the

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physical interpretation of the classical Picard Lefschetz formula  
(Cutkosky rules) and the relation with Feynman's "i epsilon" rules.

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