

JPM LYON 2014

LECTURES:

1) "Wild Character Varieties and Wild Mapping Class Groups"

Philip Boalch, École Normale Supérieure Paris

The wild character varieties are a new class of symplectic/Poisson varieties that generalize the complex character varieties of Riemann surfaces. They were first defined analytically in 1999 and more recently there is a purely algebraic approach generalizing the quasi-Hamiltonian framework. I'll describe the main features of this story, including the link to meromorphic Higgs bundles/Hitchin systems/isomonodromy and the natural generalisations of the notions of "Riemann surface" and "mapping class group" that it leads to.

- 1) motivation, background, examples, Stokes phenomenon
- 2) wild nonabelian Hodge theory on curves
- 3) wild character varieties and Stokes local systems
- 4) wild mapping class groups

2) "Algebraic Structures in 1+1 Dimensional Massive (2,2) Theories"

Greg Moore, Rutgers University

Lecture 1: Motivation

- a.) Review of 2d/4d systems and spectral networks
- b.) Motivation from knot homology: Paper of Gaiotto-Witten

Lecture 2: Webology Part 1

- a.) Definitions of plane, half-plane, strip webs
- b.) Representations of webs: L-infinity structure and the Definition of a Theory
- c.) A-infinity categories of Branes

Lecture 3: Webology Part 2

- a.) Interfaces

- b.) Categorical transport: Simple examples
- c.) Categorical wall-crossing

Lecture 4: Realization in LG Models

- a.) Review of SQM and its relation to Morse theory
- b.) LG models on the real line, half-line, and interval
- c.) zeta-instantons
- d.) LG Interfaces
- e.) Comment on generalizations

3) "Quiver Moduli and BPS State Counts"

Markus Reineke, Bergische Universität Wuppertal

Abstract:

The aim of the course is to give a mathematical introduction to the following topics:

- quivers and their representations,
- construction and properties of quiver moduli,
- cohomology of quiver moduli,
- wall crossing formulas: HN recursion, KS wall-crossing, MPS wall-crossing, MPS degeneration,
- BPS state counts aka DT invariants of quivers,
- BPS state algebra aka COHA.

SEMINARS

1) TBA

Iosif Bena, CEA Saclay

2) "On cluster varieties associated with tree-shaped quivers"

Frédéric Chapoton, Université Claude Bernard Lyon 1

Abstract:

Cluster algebras have been introduced by Fomin and Zelevinsky around 2000, and have since then grown into a very large domain, with multiple connections to subjects of interest in mathematical physics. I will present a study of the algebraic varieties attached by the cluster theory to very simple quivers, namely those that have the shape of a tree. One can ask many questions about these varieties: are they smooth ? how many points do they have over finite fields ? what are their cohomology rings ? and so on. I will present some results on the matter.

3) "Progress about 4D N=2 BPS quivers"

Michele Del Zotto, Harvard University