

Workshop in Princeton – February 18 - 20, 2010

Flat Conformal Lorentzian Structures

SCHEDULE

All talks will take place in the PL (top floor) in Fine Hall

Day	Time	Speaker	Title
Thursday	9:30 - 10:30	W. Goldman	Flat conformal Lorentzian structures – an introduction
	11:00 - 12:00	J.-M. Schlenker	An introduction to Anti-de Sitter space and the Einstein universe
	1:30 - 2:30	T. Drumm	Flat Lorentz Manifolds, One-Holed Tori and Cross-Surfaces
Friday	3:00 - 4:00	V. Charette	Some surface group actions on the Einstein universe
	9:00 - 10:00	C. Frances	Conformal embeddings of Kleinian manifolds
	11:00 - 12:00	O. Guichard	Domains of Discontinuity and Anosov Representations
	2:00 - 3:00	Y. Kamishima	Conformally flat Fefferman - Lorentz manifolds
Saturday	4:00 - 5:00	K. Melnick	Normal forms for conformal vector fields on Lorentzian manifolds
	9:00 - 10:00	T. Barbot	Spacetimes with particles: mathematical aspects
	11:00 - 12:00	J.-M. Schlenker	Maximal surfaces in AdS and minimal extension of quasi-symmetric homeomorphisms

For updated information see <http://www.math.princeton.edu/~wienhard/workshop10/lorentzian.html>

TITLES AND ABSTRACTS

Thierry Barbot: Spacetimes with particles: mathematical aspects. I will present "old" and recent examples of spacetimes (essentially of dimension 2+1) with (or without) particles, and related classification problems.

Virginie Charette: Some surface group actions on the Einstein Universe. A sequel to Todd Drumm's talk.

Todd Drumm: Flat Lorentz Manifolds, One-Holed Tori and Cross-Surfaces.

Charles Frances: Conformal embeddings of Kleinian manifolds.

Olivier Guichard: Domains of Discontinuity and Anosov Representations. Anosov representations are representations of a hyperbolic group Γ into a semisimple Lie group G whose limit set satisfies some geometric properties (that we will describe). This notion due to François Labourie generalized the notion of quasifuchsian representation of surface groups into $\mathrm{PSL}(2, \mathbf{C})$.

In this joint work with Anna Wienhard we explain given an Anosov representation ρ how to construct an open ρ -invariant subset U in a projective space associated to G (or more generally in the flag variety associated to G) such that Γ acts properly discontinuously on U with compact

quotient. In turn this can be used to give a description of the “higher Teichmüller spaces” as a component of the moduli space of geometric structures of a compact manifold.

Yoshi Kamishima: Conformally flat Fefferman - Lorentz manifolds.

Karin Melnick: Normal forms for conformal vector fields on Lorentzian manifolds.

Isometries of Riemannian or pseudo-Riemannian manifolds are linearizable in the neighborhood of a fixed point via the exponential map. Conformal transformations, on the other hand, are not linearizable in general. I will present recent work with C. Frances toward normal forms for conformal vector fields on pseudo-Riemannian manifolds for which the flow has bounded differential at a singularity. In particular, when the metric is real-analytic, we show such a flow either is linearizable, or the manifold is conformally flat, and the flow is locally conjugate to a conformal flow on the corresponding flat Minkowski space.

Jean-Marc Schlenker: Maximal surfaces in AdS and minimal extension of quasi-symmetric homeomorphisms.

A quasi-symmetric homeomorphism $u : S^1 \rightarrow S^1$ has a unique extension as a minimal Lagrangian quasi-conformal diffeomorphism from the hyperbolic plane to itself. This is proved through an existence and uniqueness theorem for maximal space-like surfaces in the anti-de Sitter space. Joint work with Francesco Bonsante.