Atelier
« Espaces de modules, systèmes intégrables et récurrences topologiques »
9-13 janvier 2016

Workshop
"Moduli spaces, integrable systems, and topological recursions"
January 9-13, 2016

Symplectic geometry on the moduli space of projective structures

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The moduli space of quadratic differentials with simple zeroes can be endowed with a natural symplectic structure, due to Korotkin, which we call homological symplectic structure.

On the other hand the affine bundle of projective connections (also to be defined) is modelled on the bundle of quadratic differentials.

By choosing a holomorphically varying base projective connection, the projective connections and the space of quadratic differentials can be naturally (but not canonically) identified.

Moreover, a projective connection defines a monodromy map and hence a point in the character variety, i.e. homomorphism of the fundamental group of a Riemann surface into unimodular two by two matrices modulo conjugations.

Goldman ('86) introduced a Poisson bracket on the character variety which, in this case, is symplectic.

Then the result is that the push forward of the homological symplectic structure to the character variety (by an appropriate choice of base projective connection) coincides with the Goldman bracket.

I hope to define all the necessary objects and be as elementary as possible.

This is joint work with Chaya Norton (Concordia) and Dmitry Korotkin (Concordia/CRM).

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