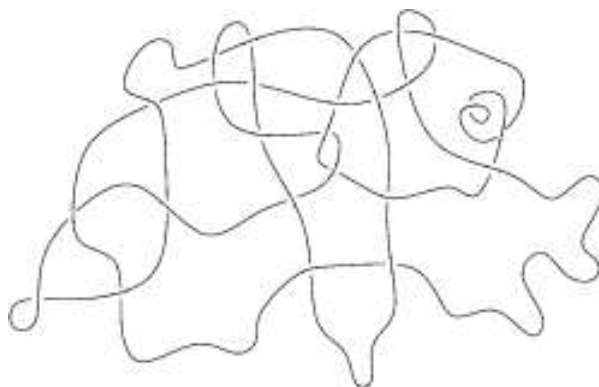


Swiss Knots 2009

Conference on low dimensional topology and knot theory



Abstracts

Anna Beliakova

Unified quantum $SO(3)$ invariants of rational homology 3-spheres

In this talk I will explain a construction of a unified invariant, which associates with any rational homology 3-sphere M an element in a modified Habiro ring (cyclotomic completion of a polynomial ring) I_M . This element dominates the $SO(3)$ Witten-Reshetikhin-Turaev invariants of M at all roots of unity and leads to new perturbative invariants (or Ohtsuki series), which are not determined by the LMO invariant.

François Cosantino

On sl_2 invariants of trivalent graphs in the sphere

I will recall the construction of Kauffman brackets of colored trivalent graphs and prove an integrality result for these invariants. Then I will discuss some open problems relating the asymptotical behavior of these invariants to the geometrical properties of the complement (volume conjecture, Witten's asymptotic expansion).

Stefan Friedl

Twisted Alexander polynomials and fibered knots

The ordinary Alexander polynomial of a fibered knot is monic and its degree equals twice the genus of the knot. This fibering obstruction has been generalized to conditions on the twisted Alexander polynomials of a fibered knot. We will show that these fibering obstructions are in fact strong enough to determine fiberedness. This is joint work with Stefano Vidussi.

Cameron Gordon

Surface subgroups of doubles of free groups

Gromov asked whether every 1-ended (word) hyperbolic group contains a surface subgroup. Focusing on the special case of the double of a free group along a cyclic subgroup, we give several sufficient conditions for Gromov's question to have an affirmative answer for such a group. This is joint work with Henry Wilton.

Martin Lustig

Horizontal Dehn surgery and genericity in the curve complex

We introduce a notion of “genericity” for countable sets of curves in the curve complex of a surface S , based on the Lebesgue measure on the space of projective measured laminations in S . With this definition we prove that the set of curves on a Heegaard surface S , on which every non-trivial Dehn twist yields a hyperbolic manifold (or rather, a Heegaard splitting of high distance), is generic in the set of all essential simple closed curves on S . Our definition of “genericity” is different and more intrinsic than the one given via random walks. Joint work with Yoav Moriah.

Julien Marché

Trace functions on the representation space of a surface in $SU(2)$

Any loop L on a surface defines a function on the moduli space of representations of the fundamental group of the surface in $SU(2)$ by taking the trace on L . I will show why the trace functions associated to multicurves (disjoint union of simple curves) are linearly independent, with an application to topological quantum field theory.

Kunio Murasugi

On the total twisted Alexander polynomials of knots

Joint work with M.Hirasawa. We discuss some properties of the total twisted Alexander polynomials of knots associated to parabolic representations and various finite representations which we prove in a series of our recent papers.

[1] M.Hirasawa-K.Murasugi, On the twisted Alexander polynomials of knots, Proceedings of the Hakone Conference, Japan, 2007,

[2] --, Evaluations of the twisted Alexander polynomials of 2-bridge knots at ± 1 , arXiv:Math/GT/0808.3085 (2008)

[3] --, Twisted Alexander polynomials of 2-bridge knots associated to metacyclic representations, preprint (2008)

[4] --, Twisted Alexander polynomials of 2-bridge knots associated to metabelian representations, preprint (2008)

Jacob Rasmussen

The Alexander polynomial of a sutured manifold

Sutured Floer homology is an invariant of sutured manifolds introduced by Andras Juhász. I'll discuss a simpler invariant determined by taking the Euler characteristic of this theory. This invariant turns out to have many properties in common with the Alexander polynomial. (For example, it's determined by π_1 .) This is joint work with Stefan Friedl and Andras Juhász.

Makoto Sakuma

On punctured torus bundles: Comparing two tessellations on the complex plane

To each once-punctured-torus bundle over the circle with pseudo-Anosov monodromy, there are associated two tessellations of the complex plane: one is the triangulation of a horosphere induced by the canonical decomposition into ideal tetrahedra, and the other is a fractal tessellation given by the Cannon-Thurston map of the fiber group. In this talk, we explain the relation between these two tessellations. This is joint work with Warren Dicks.

Catharina Stroppel

Convolution algebras and Khovanov homology

We construct convolution algebras using cohomologies of certain spaces of flags. Depending on the choice of orientations these algebras become associative or not. With the correct choices we obtain Khovanov's algebra and conjecturally the Floer homology algebra studied by Seidel and Smith. Different orientations yield algebras which can be defined using embedded cobordisms.

Stephan Wehrli

Sutured Floer homology and the colored Jones polynomial

Sutured Floer homology is a new invariant for balanced sutured 3-manifolds, which was discovered by A. Juhász in 2006, and which generalizes both Heegaard Floer homology and knot Floer homology. In a first part of my talk, I will recall the definition of sutured Floer homology and discuss some of its properties. In a second part, I will demonstrate how sutured Floer homology can be used to establish, for every knot K and every integer $n > 1$, the existence of a spectral sequence converging from Khovanov's categorification of the reduced n -colored Jones polynomial to a certain knot Floer homology group, which depends only on the knot K and on the parity of n . As a corollary, I will show that Khovanov's categorification of the reduced n -colored Jones polynomial detects the unknot for all $n > 1$. This is joint work with J. Elisenda Grigsby.