

WORKSHOP ON SYMPLECTIC TOPOLOGY: ABSTRACTS

Filip Bročić: Arnold's chord conjecture for certain cotangent bundles

Abstract. Arnold's chord conjecture predicts that on every closed co-oriented contact manifold, for every choice of contact form, and every closed Legendrian, there exists a non-constant Reeb chord with endpoints on the Legendrian. In the talk, I will present our proof of the chord conjecture for cosphere bundles of manifolds that admit a submersion from the product of spheres. This follows from a more general Theorem of ours, which proves the chord conjecture for a broader class of contact manifolds that admit Liouville fillings possessing rich enough BV-algebra on symplectic cohomology. This talk is based on joint work with Dylan Cant.

Lev Buhovsky: Asymptotic Hofer geometry on surfaces

Abstract. The growth of the Hofer norm of iterations of a Hamiltonian diffeomorphism is still not well understood in general. In all known examples where the growth is not asymptotically linear, it appears to be bounded. This dichotomy phenomenon was previously demonstrated by Polterovich and Siburg for autonomous diffeomorphisms on (open) connected surfaces of infinite area. In my talk, I will discuss a new approach that extends this result to the 2-sphere and potentially to other closed surfaces. Based on a joint work with Ben Feuerstein, Leonid Polterovich and Egor Shelukhin.

Mihajlo Cekić: SRB measures and the vertical Monge-Ampere equation

Abstract. The Sinai-Ruelle-Bowen (SRB) measure of an Anosov flow is the natural replacement for the volume measure in the non-volume preserving case. In this talk, I will discuss when the SRB measure of an Anosov geodesic spray can be interpreted as a fibrewise Monge-Ampere measure of a Finsler metric. As an application, I will demonstrate that the helicity of Hilbert geodesic flows on properly convex projective surfaces is always positive.

Georgios Dimitroglou Rizell: Non-regular concordances between stabilised Legendrian knots

Abstract. We discuss a flexibility result that makes it possible to approximate totally real concordances in the symplectisation by Lagrangian concordances, after adding sufficiently many stabilisations of both signs to the Legendrian knots. The main application is the

construction of Lagrangian concordances that are not regular in the sense of Eliashberg, and not even ribbon. This is joint work with R. Golovko.

Yaniv Ganor: TBA

Abstract.

Fabio Gironella: Confoliations in high odd dimensions

Abstract. In a pioneering work of 1998, Eliashberg and Thurston proved that, in ambient dimension 3, C^2 foliations can always (besides one example) be C^0 -approximated by contact structures in the space of plane fields. To do so, they introduce what they called “confoliations”; these are geometric structures which are mid-way between foliations and contact structures. While these have been studied extensively in dimension 3 by many authors, the situation in higher dimensions is less clear, and there is not even a consensus on what their definition should be. In this talk, based on joint works with Robert Cardona and (in progress) with Seungook Yu, I will present a candidate notion of high-dimensional (c-)symplectic confoliation, and explain why it seems to be well suited to generalize some of the 3-dimensional results by Eliashberg and Thurston. I will focus in particular on a Reeb stability type statement, and on an obstruction to contact approximations.

Jacob Hedrick: New examples of non-orderable contact manifolds

Abstract. Orderability of a contact manifold was introduced by Eliashberg and Polterovich as the existence of a certain partial order on the universal cover of the group of contactomorphisms, and is equivalent to the non-existence of contractible loops of contactomorphisms that are positively transverse to the contact distribution. I will present recent joint work with Egor Shelukhin in which we construct new examples of non-orderable contact manifolds, i.e., contact manifolds that admit positive contractible loops of contactomorphisms. This talk will mostly focus on the 3-dimensional case.

Stefan Matijević: TBA

Abstract.

Jo Nelson: Reeb dynamics of contact toric structures and concave boundaries of plumbings

Abstract. We discuss symplectic fillability results for concave plumbings of symplectic disk bundles over surfaces admitting a concave contact boundary. Their fillability relates to the embeddability of singular complex curves. This talk focuses on algebraic torsion and the contact invariant in embedded contact homology, useful for obstructing symplectic fillability and overtwistedness of the contact 3-manifold, but mostly left unexplored. Algebraic torsion is a means of understanding the topological complexity of certain homomorphic curves counted in some Floer theories of contact manifolds. We explain our curve counting methods in terms of the Reeb dynamics and their parallel with the topological contact toric description of these lens spaces. This talk is based on joint work with Aleksandra Marinković, Ana Rechtman, Laura Starkston, Shira Tanny, and Luya Wang.

Yaron Ostrover: Symplectic Barriers

Abstract. In a seminal paper, Biran introduced the notion of Lagrangian barriers, a symplectic rigidity phenomenon in which certain symplectic objects are forced to intersect a given Lagrangian submanifold. In this talk, we discuss an analogous phenomenon for symplectic submanifolds, namely a rigidity arising from mandatory intersections of symplectic embeddings with symplectic submanifolds. The talk is based on joint work with Pazit Haim-Kislev and Richard Hind.

Vukašin Stojisavljević: Coarse nodal counts on sub-Riemannian manifolds

Abstract. Sub-Riemannian geometry is a generalization of Riemannian geometry in which scalar products are defined on a subbundle of the tangent bundle which satisfies a certain non-integrability condition. A notable class of examples of such subbundles is given by contact distributions. The sub-Riemannian analogue of the Laplace-Beltrami operator is called the sub-Laplacian. I will explain how topological persistence can be used to study eigenfunctions of sub-Laplacians. In particular, I will present coarse versions of Bézout's theorem and Courant's nodal domain theorem for linear combinations of eigenfunctions of sub-Laplacians. These results partially generalize analogous theorems recently proved in the Riemannian setting. The talk is based on joint work with Irene Silvestre-Roselló.

Maksim Stokić: Bi-invariant metrics on Hamiltonian diffeomorphism groups

Abstract. Bi-invariant metrics play an important role in understanding the geometry of Hamiltonian diffeomorphism groups. In this talk, I will present a classification of all bi-invariant pseudo-metrics on the group of Hamiltonian diffeomorphisms of an exact symplectic manifold. The key ingredient is a flexibility property of the adjoint action of the Hamiltonian diffeomorphism group on its Lie algebra, showing that every compactly supported smooth function admits a decomposition as a finite weighted sum of functions from

the adjoint orbit of any given non-constant smooth function. This decomposition yields strong constraints on Hamiltonian-invariant norms on the Lie algebra, implying that every such norm is bounded from above by the sum of the L^∞ and L^1 norms. This is joint work with Lev Buhovsky.

Jun Zhang: Symplectic dynamics via a tube construction

Abstract. This talk studies Hamiltonian dynamics on Liouville domains using a geometric approach, specifically via a tube construction that results in higher-dimensional Liouville domains. We introduce a Thompson-type pseudo-metric on Hamiltonians, which yields stability results and is bounded below by symplectic and contact Banach-Mazur distances. Relations between the topological entropy of Hamiltonian dynamics and Reeb dynamics are examined, along with the behavior of symplectic capacities. Finally, a generalized tunnel construction provides a categorification of this metric, and we connect the symplectic homology of the tube to Hamiltonian Floer homology on the base. This talk is based on joint work with Qi Feng.

Frol Zapolsky: Symplectophagy

Abstract. A symplectophagy is a symplectic isotopy satisfying certain conditions reminiscent of the symplectic camel. In the talk I'll define this notion and provide new examples of symplectic rigidity which take the form of obstructions to the existence of symplectophagies in some circumstances. These obstructions are a consequence of properties of the so-called relative symplectic cohomology, a theory recently introduced by Umut Varolgunes, as well as its generalization to pairs of sets, defined by myself, Dickstein, Ganor, and Polterovich. Based on work in progress joint with Dickstein and Ganor.

Fabian Ziltener: TBA

Abstract.

Filip Živanović: Floer-theoretic filtration for Hilbert schemes and Higgs moduli spaces

Abstract. We compute the Floer-theoretic filtration on the cohomology (previously developed in the joint work with A. Ritter) for Hilbert schemes of symplectic surfaces and ordinary Higgs moduli spaces. This is a joint work in progress with Alexandre Minets.