Scientific report

for Short visit grant application 3868 in the program ITGP (Interaction of Low-Dimensional Topology and Geometry with Mathematical Physics)

Visit dates: January 22, 2011 to January 30, 2011

The purpose of the visit was work on joint project with B. Owens at Glasgow University on a concordance invariant of knots encoding information about surgeries on knots. We have previously established the existence of this invariant of knots m(K) that describes the interval of positive Dehn surgeries on a knot K in S^3 that do not bound negative definite 4-manifolds. This has implications for existence of symplectically fillable contact structures on the surgery manifold generalizing some results of Lisca and Stipsicz.

During the visit we were trying to establish some further general properties of the invariant. Specifically we were trying to show that this invariant is subadditive, ie. if K and L are two knots in S^3 then m(K # L) <= m(K) + m(L). The subadditivity is easy to establish for integer surgeries (indeed, it holds if at least one of the surgeries is integral). We were able to resolve in positive the question of subadditivity for rational surgeries in a number of special cases (eg. when the sum of the invariants of the summands is an integer). As a result of the work done during the visit we feel there is a fair chance we will be able to prove the conjectured subadditivity property in general and will therefore continue the work started during the visit. We are planning to include this work in a future publication.

During the visit S. Strle gave a talk in the Geometry and Topology seminar at Glasgow University on his work with D. Ruberman on concordance of links. He also spent some time discussing with host's Ph.D. student A. Donald.

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