Northern California Symplectic Geometry Seminar

Berkeley – Davis – Santa Cruz – Stanford

Monday, October 3, 2011

BERKELEY

2:30–3:30 100 WHEELER HALL
(SW from Evans Hall: see http://berkeley.edu/map/maps/ABCD345.html)
Maksim Maydanskiy (Stanford)
Floer theoretically essential tori in rational blowdown

Abstract:

We study a family of monotone Lagrangian tori in the Milnor fibre of the complex surface singularity of type A_n. By presenting these Lagrangians as matching tori in a Lefschetz fibration, we compute their Floer homology and conclude that none of them are displaceable. We next study some finite unramified quotients of the A_n Milnor fibre which coincide with the Stein surfaces appearing in Fintushel and Sterns rational blowdown construction. We show that these Stein surfaces have no exact Lagrangian submanifolds. However they do have Floer theoretically essential monotone Lagrangian tori, finitely covered by the monotone tori that we studied in the A_n Milnor fibre. We conclude that these Stein surfaces have non-vanishing symplectic cohomology. This is joint work with Yanki Lekili.

3:30–4:00 1015 Evans Hall
Tea Break

4:15–5:15 740 Evans Hall
Andreas Floer Memorial Lecture
Richard Montgomery, UC Santa Cruz
K3 and the planar 4-body problem.

Abstract: Newton's differential equations for the N-body problem have rotational and translational symmetry. Their flow is incomplete. Symplectic reduction eliminates the symmetries. We can make the flow complete by eliminating the collision singularities. Levi-Civita regularization eliminates the binary collision singularities in the planar N-body problem. McGehee blow-up eliminates triple collision singularities (and k-tuple collision singularities, $k > 2$). We show that, when reduction, regularization, and blow-up are all applied in a 'democratic way' to the planar 4-body problem, the resulting completed flow lives on the cotangent bundle of the cone over the K3 surface. McGehee blow-up is in essence real blow-up, i.e converting to spherical coordinates. Key to our success is to modify McGehee's blow-up construction so that it becomes in essence the familiar complex blow-up. As a warm-up, we will begin with the planar 3-body problem, where a central feature of the reduced, regularized, blown-up dynamics becomes a 4:1 branched cover of the Riemann sphere, exhibiting octahedral symmetry.

This work is joint with Rick Moeckel of the University of Minnesota.

Please contact alanw@math.berkeley.edu to arrange parking.

There may be no dinner this time, in view of the evening event with James Simons and Robert Osserman, organized by MSRI. See http://www.msri.org/web/msri/about-msri/show/-/event/Em9298

—D. Auroux, Y. Eliashberg, D. Fuchs, V. Ginzburg, M. Hutchings, E. Ionel, R. Montgomery, A. Weinstein