Institute of Mathematical Research, Department of Mathematics, University of Hong Kong

Workshop (including the Hong Kong Geometry Colloquium)

Classical and Quantum Aspects of Symplectic Geometry

Saturday, 31 March, 2012 Room 210, Run Run Shaw Building, University of Hong Kong

Morning Session (Hong Kong Geometry Colloquium)

10:00-10:05 Ngaiming Mok (Director of IMR, University of Hong Kong)
Opening remarks

10:05-11:05 Yoshiaki Maeda (Keio University, Japan)
Deformation quantization and spectral analysis

11:20-12:20 Nan-Kuo Ho (National Tsing-Hua University, Taiwan)
On the moduli space of flat connections over a nonorientable surface

Afternoon Session

14:00-15:00 River Chiang (National Cheng-Kung University, Taiwan)
Mean Euler characteristic and contact open books

15:10-16:10 Wei-Ping Li (Hong Kong University of Science and Technology)
Cohomological crepant resolution conjecture for the Hilbert scheme of points on surfaces

16:30-17:30 Huai-Liang Chang (Hong Kong University of Science and Technology)
Algebraic geometric construction of Guffin-Sharpe-Witten model and Fan-Jarvis-Ruan-Witten theory

Organizer: Siye Wu
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Abstracts

Huai-Liang Chang (University of Science and Technology, Hong Kong)
Algebraic geometric construction of Guffin-Sharpe-Witten model and Fan-Jarvis-Ruan-Witten theory
Abstract: The Gromov-Witten theory motivates the construction of A-twisted topological string for Landau Ginzburg (LG) space. For affine LG space Fan-Jarvis-Ruan constructed the invariant analytically. For other LG space Guffin-Sharpe related the invariant to ordinary GW invariants for genus zero by path-integral argument. In this talk I give an algebro geometric construction of both Fan-Jarvis-Ruan-Witten and Guffin-Sharpe-Witten theories. The construction works for all genus and we prove GSW=GW in algebraic geometry. Our main techinique is Kiem-Li cosection localization. It is a joint work with J. Li and W.-P. Li.

River Chiang (National Cheng-Kung University, Taiwan)
Mean Euler characteristic and contact open books
Abstract: An (abstract) contact open book can be constructed with a given compact Weinstein manifold W with boundary and a compactly supported symplectomorphism (monodromy) on W. In this talk, I will describe certain open books for certain contact manifolds, and use the mean Euler characteristic to distinguish the monodromies. This is based on a joint work in progress with F. Ding and O. van Koert.

Nan-Kuo Ho (National Tsing-Hua University, Taiwan)
On the moduli space of flat connections over a nonorientable surface
Abstract: In this talk, I will construct a natural class of metrics for the moduli space of flat connections on a nonorientable surface, calculate the Riemannian volume of the moduli space according to these metrics, and explain the difference between ours and Witten's volume formula. If time permits, I will also talk about the Morse theory approach on computing the Poincaré series of the moduli space of flat connections over a nonorientable surface.

Wei-Ping Li (University of Science and Technology, Hong Kong)
Cohomological crepant resolution conjecture for the Hilbert scheme of points on surfaces
Abstract: The Hilbert scheme of n points on a surface is the crepant resolution of the n-fold symmetric product of the surface. Yongbin Ruan conjectured that the cohomology ring structure of the Hilbert scheme can be related to the Chen-Ruan cohomology ring of the symmetric product via a correction from extremal Gromov-Witten invariants. In this talk, we will discuss the proof of the conjecture in the joint work with Zhenbo Qin with lots of help from Jun Li. We first prove a universality result by the detailed analysis of the virtual cycle of the moduli space of three-points extremal stable maps to the Hilbert scheme using a method of Jun Li on Hilbert scheme of points on three-folds and the cosection localization of Kiem-Li, and by the vertex algebraic treatment of the cohomology of Hilbert scheme and the symmetric product due to Nakajima, Lehn, Li-Qin-Wang, and Qin-Wang. Then the result of Cheong who proves Ruan's conjecture for toric surfaces is used to prove the conjecture for general projective surfaces.

Yoshiaki Maeda (Keio University, Japan)
Deformation quantization and spectral analysis
Abstract: We will discuss the spectral analysis via deformation quantization. Our approach is to use the several representations of deformation quantization instead of representation space.