International Workshop on Geometry and Mathematical Physics

October 21-22, 2011

Room 502A, Academic Building No. 1, The Chinese University of Hong Kong

Schedule

October 21, Friday	Speaker & Title & Abstract
11:00am – 12:00noon	**Jiajin Zhang (Sichuan University, China)** *Quasi-Minuscule Representations and Rational Surfaces*
12:00noon – 2:00pm	Lunch
2:00pm – 3:00pm	**Jae-Hyouk Lee (Ewha Womans University, Korea)** *Gosset polytopes and del Pezzo surfaces*
3:00pm – 3:30pm	Tea Break
3:30pm – 4:30pm	**Siu-Cheong Lau (IPMU, University of Tokyo, Japan)** *Open Gromov-Witten Invariants and Mirror Maps for Semi-Fano Toric Manifolds*

October 22, Saturday	
9:40am – 10:40am	**Helge Ruddat (Universität Mainz, Germany)** *Mirror Symmetry beyond Calabi-Yau and Fano*
10:40am – 11:00am	Tea Break
11:00am – 12:00noon	**Changzheng Li (IPMU, University of Tokyo, Japan)** *Spaces of Lines in G/B*
12:00noon	Workshop Lunch Banquet

~~ All Are Welcome ~~

Titles and Abstracts

Jiajin Zhang (Sichuan University, China)
Quasi-Minuscule Representations and Rational Surfaces

Abstract: We describe the relation between quasi-minuscule representations and rational surfaces. To each quasi-minuscule representation, we attach a class of rational surfaces, and realize such a representation as an associated vector bundle of a principal bundle. Furthermore, we show that any quasi-minuscule representation can be defined by rational curves (or their disjoint unions) satisfying certain natural numerical conditions in a rational surface.

Jae-Hyouk Lee (Ewha Womans University, Korea)
Gosset polytopes and del Pezzo surfaces

Abstract: It is well know that the set of vertices of Gosset polytopes and the set of lines in del Pezzo surfaces have the same number of elements, and this fact has been an important motivation in many interesting researches including Leung and Zhang's work on the representation theory on bundles. In fact, the bijection between vertices and lines can be understood via Weyl group action. From this point of view, we study del Pezzo surfaces via the combinatorial data of Gosset polytopes. We introduce special divisor classes in del Pezzo surfaces to match combinatorics of Gosset polytopes. And we describe configurations of lines in del Pezzo surfaces with them. We also discuss similar study on Hirzebruch surfaces.

Siu-Cheong Lau (IPMU, University of Tokyo, Japan)
Open Gromov-Witten Invariants and Mirror Maps for Semi-Fano Toric Manifolds

Abstract: In this talk I will explain my recent joint work with KW Chan, NC Leung and HH Tseng on mirror maps via the SYZ approach. We work on semi-Fano toric manifolds and show that the SYZ construction agrees with the traditional mirror maps under a convergence assumption, which is satisfied for a large class of manifolds. This gives an open analog of closed-string mirror symmetry, leading to a new computational method of open Gromov-Witten invariants via mirror symmetry.

Helge Ruddat (Universität Mainz, Germany)
Mirror Symmetry beyond Calabi-Yau and Fano

Abstract: In a joint work with Mark Gross and Ludmil Katzarkov, we propose a construction for mirror symmetry partners which works for any Kodaira dimension. In general, the mirror will be very singular and equipped with a sheaf of vanishing cycles. We associate Hodge numbers to the singular space with this sheaf and show that these fulfill the mirror duality $h^{p,q}(X)=h^{d-p,q}(Y)$ for X, Y a mirror pair of our construction. In this talk, I will draw a connection with homological mirror symmetry, introduce the construction and demonstrate a few examples.

Changzheng Li (IPMU, University of Tokyo, Japan)
Spaces of Lines in G/B

Abstract: In this talk, I will show that some special K-theoretic Gromov-Witten invariants of complete flag varieties coincides with certain classical K-theoretic triple intersection numbers. This is joint work with Leonardo Mihalcea, and it could be treated as a generalization of a special case of my joint work with Conan Leung on quantum cohomology of flag varieties.