



CUHK-SYSU Joint Online Workshop on Geometry and Physics

Date: July 19, 2021 (Monday)

Venue: Online (via ZOOM)

Purpose: Due to the pandemic, it has become very difficult to have international visits nowadays. To facilitate academic communication in mathematics between Sun Yat-sen University (SYSU) and The Chinese University of Hong Kong (CUHK), we organize a series of joint online workshops. This is second workshop in the series, which will be fully supported by CUHK.

Organizers:

Kwokwai Chan (CUHK)

Naichung Conan Leung (CUHK)

Changzheng Li (SYSU)

Schedule:

09:00 – 10:00	Maurer-Cartan deformation of a Lagrangian by Hansol Hong (Yonsei University)
10:00 – 11:00	On Seidel representation of quantum K-theory of Grassmannians by Changzheng Li (Sun Yat-Sen University)
11:00 – 12:00	Holomorphic differential operators via Fedosov quantization by Qin Li (Southern University of Science and Technology)
12:00 – 13:00	Deformation quantization of coadjoint orbits by Shilin Yu (Xiamen University)

Zoom link:

<https://cuhk.zoom.us/j/91280841007>

Meeting ID: 912 8084 1007

Passcode: 029340

Titles and abstracts:

Hansol Hong (Yonsei University)

Title: Maurer-Cartan deformation of a Lagrangian

Abstract: The Maurer-Cartan algebra of a Lagrangian is the algebra that encodes the deformation of its Floer complex as an A_∞ algebra. I will give a convenient description of the Maurer-Cartan algebra through a natural homological algebra language, and relate it with (a version of) Koszul duality for the Floer complex. It helps us to obtain the mirror-symmetry interpretation for the Maurer-Cartan deformation and its locality in SYZ situation. Namely, the Maurer-Cartan algebra provides a neighborhood of the point mirror to the Lagrangian, which varies in size depending on geometric types of Floer generators involved in the deformation

Changzheng Li (Sun Yat-Sen University)

Title: On Seidel representation of quantum K-theory of Grassmannians

Abstract: The K-theoretic quantum Pieri rule by Buch and Mihalea implies a cyclic symmetry on the quantum K-theory of complex Grassmannian $Gr(k, n)$. In this talk, we will discuss applications of the Seidel representation. Especially, we will provide an accessible sufficient condition for the reduction of quantum Schubert structure constants of degree d to that of degree $d - 1$. We will also introduce a quantum Littlewood-Richardson rule for $QK(Gr(3, n))$. This is my joint work with Chaoyang Liu, Jiayu Song and Mingzhi Yang.

Qin Li (Southern University of Science and Technology)

Title: Holomorphic differential operators via Fedosov quantization

Abstract: Although Toeplitz operators on Kähler manifolds associate smooth function to operators on Hilbert spaces $\mathcal{H} = H^0(X, L^k)$, their composition only gives a formal deformation quantization by considering the asymptotic $k \rightarrow \infty$ and turning $1/k$ to \hbar . In this talk, I apply the method of Fedosov to quantize a subclass of smooth functions $A \subset C^\infty(X)$ to holomorphic differential operators on \mathcal{H}_k . This gives a strong version of quantization since A acts on Hilbert spaces as differential operators which gives a non-formal deformation of the classical multiplication.

Shilin Yu (Xiamen University)

Title: Deformation quantization of coadjoint orbits

Abstract: The coadjoint orbit method/philosophy suggests that irreducible unitary representations of a Lie group can be constructed as quantization of coadjoint orbits of the group. In this talk, I will propose a geometric way to understand orbit method using deformation quantization, in the case of noncompact real reductive Lie groups. This approach combines recent results on quantization of symplectic singularities and Lagrangian subvarieties. This talk is based on joint work with Conan Leung and ongoing joint project with Ivan Losev.