Lecture Series in Algebraic Geometry

Sep 2 – 6, 2019

Morningside Center of Mathematics CAS

Sponsors:

Academy of Mathematics and System Sciences, CAS,

Morningside Center of Mathematics,

National Science Foundation of China

Contents

The conference “Lecture Series in Algebraic Geometry” will be held at **Morningside Center of Mathematics**, which was founded by Chinese Academy of Sciences in 1996 and **Professor Shing-Tung Yau** has been serving as the director of the center.

Registration Date & Location:

September 2, 2019, 8:30-9:30, MCM Building 1 Floor reception

Address: No. 55, Zhongguancun Eest Road, Haidian District, Beijing

地址：北京市海淀区中关村东路 55 号

Conference Time: September 2-6, 2019

Conference Venue: MCM Building 110

Address: No. 55, Zhongguancun Eest Road, Haidian District, Beijing

地址：北京市海淀区中关村东路 55 号

Website: www.mcm.ac.cn/activities/programs/2019LSAG

QR code of the conference:

Contact: Xiao Luo (罗潇) **Email: mcmoffice@math.ac.cn**

WeChat QR code:

Conference Staff:

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Location


Liaoning International Hotel
BANK OF CHINA
Youth Apartment, No 2 Building
Walmart Supermarket
MCM Building
WUKE Restaurant
South Building
Junma Hotel
AGRICULTURAL BANK OF CHINA
Zhongguancun South 4th Street
Zhongguancun East Road
Zhongguancun South 3rd Street
Zhongguancun South 2nd Street
Zhongguancun South 1st Street
Zhongguancun Street
Academy Science South Road
Zhongguancun South Road
Fourth Ring Road
Subway, Line 13
Walmart
Carrefour supermarket

Invited Speakers

Conan Leung	Chinese University of Hong Kong
Zhiyuan Li	Fudan University
Laurent Manivel	Paul Sabatier University
Yoshinori Namikawa	Kyoto University
Junyi Xie	Université de Rennes 1
Ying Xie	Chinese University of Hong Kong
Shilin Yu	Xiamen University

Organizers

Baohua Fu	Morningside Center of Mathematics
Yujiro Kawamata	University of Tokyo / MCM
Shigeru Mukai	RIMS / MCM

Conference Schedule

September 2, 2019 (MCM 110)		
08:30-09:30	Registration：MCM Building First Floor reception	
09:30-10:30	Conan Leung / Ying Xie	Categorical Plucker Formula and homological projective duality (Ⅰ)
10:30-10:45	Coffee break, Group Photos (in front of the MCM building gate)	
10:45-11:45	Junyi Xie	Determine the affine space by its automorphism group (Ⅰ)
11:45-13:30	Lunch	
13:30-14:30	Zhiyuan Li	Algebraic cycles on moduli space of hyper-Kähler varieties (Ⅰ)
14:45-15:45	Yoshinori Namikawa	Birational geometry for the covering of a nilpotent orbit closure (Ⅰ)
15:45-16:00	Coffee break	
16:00-17:00	Shilin Yu	Deformation quantization of coadjoint orbits
September 3, 2019 (MCM 110)		
09:30-10:30	Zhiyuan Li	Algebraic cycles on moduli space of hyper-Kähler varieties (Ⅱ)
10:30-10:45	Coffee break	
10:45-11:45	Laurent Manivel	Topics on the geometry of homogeneous spaces (Ⅰ)
11:45-13:30	Lunch	
13:30-14:30	Yoshinori Namikawa	Birational geometry for the covering of a nilpotent orbit closure (Ⅱ)
14:45-15:45	Junyi Xie	Determine the affine space by its automorphism group (Ⅱ)
15:45-16:00	Coffee break	
16:00-17:00	Conan Leung / Ying Xie	Categorical Plucker Formula and homological projective duality (Ⅱ)
17:30-20:00	Banquet	

September 4, 2019		
9:30-17:00	Free discussion	
September 5, 2019 (MCM 110)		
09:30-10:30	Laurent Manivel	Topics on the geometry of homogeneous spaces (Ⅱ)
10:30-10:45	Coffee break	
10:45-11:45	Yoshinori Namikawa	Birational geometry for the covering of a nilpotent orbit closure (Ⅲ)
11:45-13:30	Lunch	
13:30-14:30	Junyi Xie	Determine the affine space by its automorphism group (Ⅲ)
14:45-15:45	Zhiyuan Li	Algebraic cycles on moduli space of hyper-Kähler varieties (Ⅲ)
15:45-16:00	Coffee break	
16:00-17:00	Laurent Manivel	Topics on the geometry of homogeneous spaces (Ⅲ)

Conan Leung / Ying Xie （Chinese University of Hong Kong）

Categorical Plucker Formula and homological projective duality

We will explain our recent joint work with Qing Yuan Jiang on homological projective duality and categorical Plucker formula for derived categories of coherent sheaves, applying the “Chess game” techniques introduced by Richard Thomas.

Zhiyuan Li （Fudan University）

Algebraic cycles on moduli space of hyper-Kähler varieties

In this lecture series, we will talk about the recent progress on studying algebraic cycle classes on the moduli space of polarized K3 surfaces and more generally, polarized hyper-Kähler manifolds. In Lecture one, we will give an introduction to hyper-Kähler geometry, including the basic concepts, Hodge theory and intersection theory on hyper-Kähler varieties. In the second lecture, I will talk about cohomology groups and Chow groups on the moduli space of hyper-Kähler varieties. In particular, I review the construction of the tautological ring on these moduli space, which is motivated from the work of Marian-Oprea-Pandaripande and Beauville-Voisin. In the third lecture, I will survey various methods, such as GIT, GW-theory and automorphic representation theory, to study some fundamental problems concerning tautological classes, which involves generalized Noether-Lefschetz conjecture, tautological conjecture and generalized Franchetta conjecture. These progress are made recently by Pandaripande-Yin, Bergeron-Li, Pavic-Shen-Yin Fu-Laterveer-Vial-Shen etc.

Laurent Manivel （Paul Sabatier University）

Topics on the geometry of homogeneous spaces

Abstract: I will introduce rational homogeneous spaces and their basic properties. Then I will explain how to use them to construct all kinds of interesting algebraic varieties, from Fano to hyperKahler manifolds, and also Calabi-Yau varieties with special properties. This will be illustrated by many instructive examples.

Yoshinori Namikawa （Kyoto University）

Birational geometry for the covering of a nilpotent orbit closure

A nilpotent orbit O of a complex semisimple Lie algebra g has finite fundamental group. Associated with an etale cover of O, we have a finite cover of the closure of O. In this talk we consider the finite cover X associated with the universal cover of a nilpotent orbit O of a classical simple Lie algebra g. We construct explicitly a Q-factorial terminalization of X in a group theoretic way.

Junyi Xie （Université de Rennes 1）

Determine the affine space by its automorphism group

Whether a (quasi-)affine variety X is determined by its automorphism group Aut(X)? The answer is no in general. On the other hand, it has positive answer in many cases, especially when Aut(X) is large. In these lectures, we discuss this problem mainly when X is the affine space. We discuss two different approaches to attack this problem. One is to study commutative algebraic subsets of Aut(X), the other one it to study certain finitely generated subgroup of Aut(X) using p-adic method. The first approach works in any characteristic, but we ask the base field to be uncountable. The second approach works over any field of characteristic zero. My lectures are based on some joint work with S.Cantat and A.Regeta.

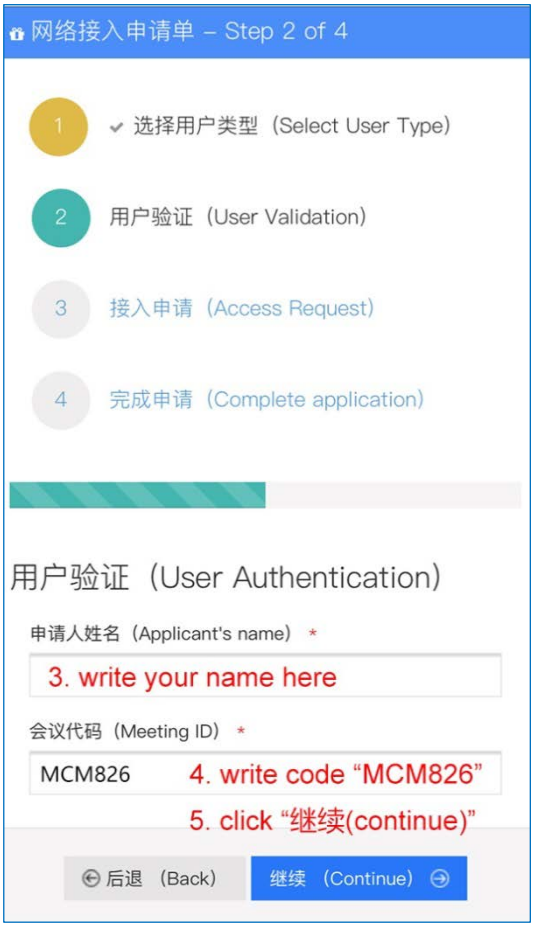
Shilin Yu （Xiamen University）

Deformation quantization of coadjoint orbits

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. Our approach combines recent results on quantization of symplectic singularities and Lagrangian subvarieties. This is joint work with Conan Leung.

WIFI

- ☐ Open your wifi and connect the SSID (wifi name) **AMSS**.
- ☐ Open a browser window and type any website address.
- ☐ It will redirect to a register form. Fill the form with Conference ID **MCM826.**



More Lectures

First week: 26th-30th August

	Monday	**Tuesday**	**Wednesday（S202）**	**Thursday**
9:30-10:30	Claire Voisin (Ⅰ)	Junyan Cao (Ⅲ)	**9:45-10:45** Zhizhong Huang(Ⅰ)	Thomas Peternell(Ⅱ)
10:45-11:45	Junyan Cao (Ⅰ)	Claire Voisin (Ⅱ)	**11:00-12:00** Luc Illusie(Ⅰ)	Ya Deng (Ⅱ)
13:30-14:30	Ya Deng (Ⅰ)	Mails Reid (Ⅱ)	Free discussion	Thomas Peternell(Ⅲ)
14:45-15:45	Mails Reid (Ⅰ)	Junyan Cao (Ⅱ)		Zhizhong Huang(Ⅱ)
16:00-17:00	Thomas Peternell(Ⅰ)	Claire Voisin (Ⅲ)		Ya Deng (Ⅲ)

Second week: 2nd-6th September

	Monday	**Tuesday**	**Wednesday**	**Thursday**
9:30-10:30	Conan Leung / Ying Xie(Ⅰ)	Zhiyuan Li (Ⅱ)	Free discussion	Laurent Manivel (Ⅱ)
10:45-11:45	Junyi Xie (Ⅰ)	Laurent Manivel (Ⅰ)		Yoshinori Namikawa(Ⅲ)
13:30-14:30	Zhiyuan Li (Ⅰ)	Yoshinori Namikawa (Ⅱ)		Junyi Xie (Ⅲ)
14:45-15:45	Yoshinori Namikawa(Ⅰ)	Junyi Xie (Ⅱ)		Zhiyuan Li (Ⅲ)
16:00-17:00	Shilin Yu	Conan Leung / Ying Xie(Ⅱ)		Laurent Manivel(Ⅲ)

Third week: 16th-20th September

	Monday	**Tuesday**	**Thursday**	**Friday**
9:30-10:30	Stéphane Druel (Ⅰ)	Fedor Zak (Ⅰ)	Qizheng Yin (Ⅱ)	Zhiyu Tian (Ⅱ)
10:45-11:45	Jun-Muk Hwang (Ⅰ)	Stéphane Druel (Ⅱ)	Fedor Zak (Ⅱ)	Qizheng Yin (Ⅲ)
13:30-14:30	Keiji Oguiso (Ⅰ)	Jun-Muk Hwang (Ⅱ)	Stéphane Druel (Ⅲ)	Free discussion
14:45-15:45	Qizheng Yin (Ⅰ)	Keiji Oguiso (Ⅱ)	Jun-Muk Hwang (Ⅲ)	
16:00-17:00	Katsuhisa Furukawa	Zhiyu Tian (Ⅰ)	Keiji Oguiso (Ⅲ)	

Fourth week: 23th-27th September

	Monday	**Tuesday**	**Thursday**	**Friday**
9:30-10:30	Yunfeng Jiang (Ⅰ)	Yunfeng Jiang (Ⅱ)	Yukinobu Toda (Ⅲ)	Free discussion
10:45-11:45	Yalong Cao (Ⅰ)	Yukinobu Toda (Ⅱ)	Yalong Cao(Ⅲ)	
13:30-14:30	Yukinobu Toda (Ⅰ)	Yalong Cao (Ⅱ)	Yunfeng Jiang (Ⅲ)	