

# Workshop: 2nd Beijing Algebraic Geometry Day

**Date:** November 23rd 2024

**Venue:** Lecture Hall (2nd Floor), Jiayibing Building,  
Jingchunyuan 82, BICMR, Peking University

Time	
9:30–10:00	Registration
10:00–11:00	Wenfei Liu
11:00–11:30	Tea
11:30–12:30	Konstantin Loginov Valerievich
12:30–14:00	Break
14:00–15:00	Zhengyu Hu
15:00–15:30	Tea
15:30–16:30	Yen–An Chen

**Everyone is welcome. If you want to participate the workshop but need entrance permission for Peking University, please contact Jihao Liu ([liujihao@mathpku.edu.cn](mailto:liujihao@mathpku.edu.cn)) or Qizheng Yin ([qizheng@math.pku.edu.cn](mailto:qizheng@math.pku.edu.cn))**

## **Talk 1 (10:00–11:00)**

**Speaker:** Wenfei Liu (Xiamen University)

**Title:** On numerically and cohomologically trivial automorphisms of properly elliptic surfaces

**Abstract:** A proper elliptic surface is an elliptic surface  $f: S \rightarrow B$  with Kodaira dimension  $\kappa(S)=1$  (over the complex numbers for this talk). Recall that an automorphism of  $S$  is called numerically trivial (resp. cohomologically trivial) if it acts trivially on  $H^*(S, \mathbb{Q})$  (resp.  $H^*(S, \mathbb{Z})$ ). It has been believed since long time that a properly elliptic surface  $S$  does not have any numerically trivial automorphisms if the geometric genus  $p_g(S) > 0$  and cohomologically trivial automorphisms do not exist even when  $p_g(S) = 0$ . Surprisingly, we have found recently examples of properly elliptic surfaces with an arbitrarily large numerical trivial (resp. nontrivial cohomologically trivial) automorphism group, which invalidates the above claims. In this talk, I will present these examples, and then give certain bound and classification of them. Based on joint work with Fabrizio Catanese, Matthias Schütt, and partly with Christian Gleißner and Davide Frapporti.

## **Talk 2 (11:30-12:30)**

**Speaker:** Konstantin Loginov Valerievich (Steklov Mathematical Institute, Russian Academy of Sciences)

**Title:** Finite abelian subgroups acting on rationally connected threefolds

**Abstract:** Finite abelian groups are one of the simplest objects studied in algebra. In turn, rational varieties form a reasonably simple class of varieties considered in algebraic geometry. However, the question of which finite abelian groups

can act on rational (or rationally connected) varieties, is far from being an easy question. In dimension 2 the answer to this question was given by A. Beauville and J. Blanc. In my talk I will consider this question in dimension three.

### **Talk 3 (14:00-15:00)**

**Speaker:** Zhengyu Hu (Chongqing University of Technology)

**Title:** Zariski decompositions and a type of MMP for generalised pairs

**Abstract:** I will discuss some easy observations on "Zariski decompositions" for klt pairs (if exists). To generalize these observations to generalised dlt pairs, I will introduce a type of MMP which preserves the decomposition. As an application I will talk some of my recent progresses.

### **Talk 4 (15:30-16:30)**

**Speaker:** Yen-An Chen (National Taiwan University)

**Title:** Foliated complements

**Abstract:** Recent progress has been made in the minimal model program for foliated varieties. A natural question arises: do Fano foliations form a bounded family? Building on Birkar's influential work on the Borisov-Alexeev-Borisov conjecture, we explore the theory of complements in the context of foliations and demonstrate the existence of complements for Fano algebraically

integrable foliations. This is a joint work with Dongchen Jiao and Pascale Voegtli.