**讲座名称**：Degenerations of K3 surfaces and tropical spheres

**主讲教师：**

Valery Alexeev，佐治亚大学（美国）

**讲座简介**：

K3 surfaces form one of the nicest and most classical types of surfaces, with many applications in algebraic geometry, symplectic geometry, arithmetics, and physics. They are two-dimensional Calabi-Yau varieties.

K3 surfaces come in countably many families of dimension <=19, the moduli spaces of lattice-polarized K3s. Many combinatorial compactifications of these spaces are known, e.g. Baily-Borel, toroidal, GIT. A very interesting problem is to find geometrically meaningful, moduli compactifications, similar to the Deligne-Mumford moduli spaces of stable curves.

I will discuss some recent approaches to this problem, combining methods from algebraic, symplectic, toric, and tropical geometries.

**讲座名称**：Introduction to the theory of quasi-log canonical pairs

**主讲教师：**

Osamu Fujino，大阪大学（日本）

**讲座简介**：

The notion of quasi-log canonical pairs was first introduced by Florin Ambro. It is a kind of generalizations of that of log canonical pairs. Now we know that quasi-log canonical pairs are ubiquitous in the theory of minimal models. The theory of quasi-log canonical pairs gives a suitable framework for cohomological

study of higher-dimensional algebraic varieties. I will explain some vanishing theorems based on the theory of mixed Hodge structures on cohomology with compact support and then treat some basic properties and examples of quasi-log canonical pairs.

**Reference:** Osamu Fujino, Foundations of the minimal model program, MSJ Memoirs, 35. Mathematical Society of Japan, Tokyo, 2017.

**讲座名称**：Introduction to boundedness of Fano varieties

**主讲教师：**

江辰，复旦大学/上海数学中心

**讲座简介**：

I will discuss recent development of boundedness of Fano varieties, including Birkar's proof of Borisov-Alexeev-Borisov conjecture. In the first lecture, I will give a brief introduction of boundedness problem. In the second to forth lectures, I will explain some ideas in Birkar's proof about boundedness of effective birationality, complements, and log canonical thresholds.