Workshop on singular canonical Kähler metrics on compact and noncompact manifolds

Thursday (September 04)

9:30-10:30 Duc Viet Vu:Local non-collapsing volume estimates for Kähler metrics in big cohomology classes

Abstract: I will explain how to generalise recent results on local non-collapsing volume estimates for smooth Kähler metrics to the setting of big cohomology classes. Among other things, our proof establishes a uniform diameter estimate for a family of smooth Kähler metrics that only involves an integrability condition. We also have to utilise the fine stability properties of complex Monge–Ampère equations with prescribed singularities. This is joint work with Duc-Bao Nguyen (NUS).

11:00-12:00 Muhammad Sohaib Khalid:Destabilising subvarieties for generalised Monge-Ampère equations

Abstract: Generalised Monge-Ampère equations include, as special cases, many well-known PDEs in Kähler geometry, including the J-equation, inverse Hessian equations and certain deformed Hermitian Yang-Mills equations. The works of G Chen, Song, Datar-Pingali, Fang-Ma and others have shown that the solvability of these equations on compact Kähler manifolds can be characterised by an algebro-geometric numerical criterion involving certain intersection numbers attached to all proper subvarieties. We report on some results (joint with Sjöström Dyrefelt) about the set of those subvarieties (called *destabilisers*) which violate this numerical criterion. The principal motivation is twofold. Firstly, it is desirable to identify situations whereby only finitely many potential destabilisers exist, which would lead to a more 'effective' test for solvability. Secondly, the work of Song-Weinkove and Datar-Mete-Song has shown that when no smooth solutions can be found and one wishes to look for singular solutions, the set of destabilisers should be closely related to the singularities.

14:00-15:00 Martin de Borbon: Polyhedral Kähler metrics on CP^n

Abstract: A polyhedral Kähler (PK) metric on a complex manifold is a polyhedral metric that is Kähler on its regular part. The talk is about positively curved (i.e. those with cone angles $< 2n$) PK metrics on CP^n whose singular set is a finite collection of complex hyperplanes. The main result is a theorem that provides necessary and sufficient conditions for the existence of such metrics in terms of their cone angles. These conditions take the form of linear and quadratic constraints, of topological origin, and are entirely determined by the intersection poset of the hyperplane arrangement. The talk is based on joint work with Dmitri Panov.

15:30-16:30 Pietro-Mesquita Piccione: A non-Archimedean approach for the Yau-Tian-Donaldson conjecture

Abstract: In Kähler Geometry, the Yau–Tian–Donaldson conjecture relates the differential geometry of compact Kähler manifold with an algebro-geometric notion called K-stability. I will start with a brief overview of the topic, and then I will discuss a possible non-Archimedean approach to solve this conjecture, generalizing a result of Chi Li to the transcendental setting.