INDIAN STATISTICAL INSTITUTE

Theoretical Statistics and Mathematics Unit, Kolkata

Thesis Proposal Defence Seminar

Date: November 17, 2023, Friday
Time: 02:00 PM

VENUE:

L-infinity

(5th Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

TITLE:

Relationship between maximal Gromov hyperbolic spaces and their boundaries

SPEAKER:

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ABSTRACT:

For "boundary continuous" Gromov hyperbolic spaces, we have canonical cross-ratios on the Gromov boundary with respect to the visual metrics. Isometry between boundary continuous Gromov hyperbolic spaces extends to a Moebius homeomorphism (cross-ratio preserving homeomorphism) between their Gromov boundaries. It is natural to ask the converse: Given a Moebius homeomorphism between the Gromov boundaries, can we extend it to an isometry of spaces? (This is the Mobius rigidity problem) This problem is related to the marked length spectrum rigidity and the geodesic conjugacy problem for negatively curved manifolds. Biswas proved we have a positive answer to the Moebius problem for a particular type of Gromov hyperbolic spaces called "maximal Gromov hyperbolic spaces". These maximal Gromov hyperbolic spaces satisfy a universal property: Given a maximal Gromov hyperbolic space, any good (proper geodesically complete "boundary continuous") Gromov hyperbolic space with the same Gromov boundary embeds isometrically into the maximal Gromov hyperbolic space. The Gromov boundary of a good Gromov hyperbolic space is a particular type of compact space called "quasi-metric antipodal space". He gave a functorial construction of maximal Gromov hyperbolic spaces corresponding to a given quasi-metric antipodal space.

In this talk, we describe the relationship between boundaries and the associated maximal Gromov hyperbolic spaces, in particular:
(1) polyhedral structure of maximal Gromov hyperbolic spaces, whose Gromov boundary has finite cardinality,
(2) convergence of the boundary, quasi-metric antipodal spaces (in a sense, similar to that of Gromov-Hausdorff convergence) implies pointed Gromov-Hausdorff convergence of the associated maximal Gromov hyperbolic spaces.
These are based on joint work with Prof Kingshook Biswas.

We shall also discuss some other problems we plan to work on.

ALL ARE CORDIALLY INVITED