

“Universal Sounds” of anti-de Sitter manifolds

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Life Sciences Center 100
Arvo J. Oopik '78 Auditorium



In musical instruments, shorter strings produce a higher pitch than longer strings. The question, "Can one hear the shape of a drum?" (M. Kac, 1966), shows a typical aspect of spectral geometry, which asks the relationship between analysis (spectrum of Laplacian) and the Riemannian geometry. What will happen about “music instrument” beyond Riemannian geometry? A basic case is Lorentz geometry familiar to us as the spacetime of relativity theory.

Recently, a new phenomenon has been discovered in anti-de Sitter manifolds, analog of spheres in Lorentz geometry, asserting that “universal sounds exist”, namely, some eigenvalues of the Laplacian do not vary under the deformation of geometric structure. I plan to explain this strange phenomenon and the methods.



Professor Toshiyuki Kobayashi is a leading mathematician working on Lie Groups and Representation Theory. He has made fundamental contributions to various aspects of the subject, including pioneering work in the study of branching problems in unitary representation theory, discontinuous groups beyond the classical Riemannian setting, and geometric analysis on minimal representations.

He is a Professor of the University of Tokyo, Japan and a Principal Investigator of Kavli IPMU.

Some of his numerous awards include: AMS Fellow (2017), Medal with Purple Ribbon (2014), Inoue Prize for Science (2010), Humboldt Prize (2008, Germany), Sackler Distinguished Lecturer (2007), Invited Speaker of International Congress of Mathematicians at Beijing (2002).

Toshiyuki Kobayashi

2017 Kemeny Public Lecture

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