

Tata Institute of Fundamental Research
is pleased to present

Branching laws for infinite dimensional representations of real Lie groups

Mathematical Panorama Lectures
(A National Mathematics Year Event)

Toshiyuki Kobayashi, University of Tokyo, Japan will give a course of lectures (Panorama lectures) at the

**Tata Institute of Fundamental Research, Mumbai,
11:30 AM – 12:30 PM, 18 – 22 February, 2013.**



About the Speaker: Professor Toshiyuki Kobayashi is a leading mathematician in Lie Groups and Representation Theory who has made fundamental contributions of various aspects of the subject. His pioneering works include 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 serves also as a Principal Investigator of Kavli IPMU.

Humboldt Prize (2008, Germany), Sackler Distinguished Lecturer (2007), Inoue Prize for Science (2010), JSPS Prize (2007), Invited Speaker of International Congress of Mathematicians at Beijing (2002), Spring Prize of Mathematical Society of Japan (1999) are some of his numerous honours.

Abstract: Branching problems ask how irreducible representations decompose when restricted to subgroups. They are very difficult in general noncompact settings. I will discuss how to single out "nice frameworks" in which we could expect fruitful studies of branching problems.

Description of Contents:

Branching problems ask how irreducible representations decompose when restricted to subgroups. Recently, obstructions for studying branching problems have been fairly well understood, in particular, wild phenomena such as infinite multiplicities or continuous spectra in dealing with noncompact subgroups.

In this talk I would like to give a general introduction to various techniques for branching problems with emphasis on the question: "How to single out a nice framework where we could expect further detailed study?" Three aspects will be highlighted:

1. ***Multiplicity-free Theorems. Theory of Visible Actions on Complex Manifolds.***

In this talk, I will discuss an application of the original theory of "visible actions" on complex manifolds to "multiplicity-free" theorems, in particular, to branching laws for reductive symmetric pairs.

2. ***Finite Multiplicity Theorems. Theory of Real Spherical Varieties.***

I plan to discuss geometric conditions that control the multiplicities in branching laws (restriction) and Plancherel formulas (induction).

3. ***Restriction of Unitary Representations. Theory of Discretely Decomposable Branching Laws.***

An algebraic and analytic approach is introduced to give a criterion for branching laws to be discretely decomposable.

4. ***Restrictions of generalized Verma Modules.***

5. ***Some Applications of Branching Problems to Geometric Problems***

All are welcome