Lie Groups and Representation Theory Seminar at the University of Tokyo

DATE   May 18 (Tue), 2010, 16:30–18:00

PLACE   Room 126, Graduate School of Mathematical Sciences

SPEAKER   **B. Speh** (Cornel University)

TITLE   On the eigenvalues of the Laplacian on locally symmetric hyperbolic spaces

ABSTRACT   A famous Theorem of Selberg says that the non-zero eigenvalues of the Laplacian acting on functions on quotients of the upper half plane H by congruence subgroups of the integral modular group, are bounded away from zero, as the congruence subgroup varies. Analogous questions on Laplacians acting on differential forms of higher degree on locally symmetric spaces (functions may be thought of as differential forms of degree zero) have geometric implications for the cohomology of the locally symmetric space.

Let X be the real hyperbolic n-space and $\Gamma \subset \mathrm{SO}(n,1)$ a congruence arithmetic subgroup. Bergeron conjectured that the eigenvalues of the Laplacian acting on the differential forms on X/Γ are bounded from the below by a constant independent of the congruence subgroup. In the lecture I will show how one can use representation theory to show that this conjecture is true provided that it is true in the middle degree.

This is joint work with T.N. Venkataramana.