

Prof. Dr. W. Müller  
Dr. J. Pfaff

Sommersemester 2013

**Seminar on Global Analysis S4B3:**

**Representation theory and harmonic analysis on  $SL(2, \mathbb{R})$**

Representation theory and harmonic analysis on semisimple Lie groups plays an important role in many fields of mathematics ranging from number theory to mathematical physics. The group  $SL(2, \mathbb{R})$  is the basic example of a non-compact semisimple Lie group. The goal of the seminar is to study some of the basic concepts of representation theory of non-compact semisimple Lie groups for the group  $SL(2, \mathbb{R})$ .

**Prerequisites:** Analysis I-III, Geometrie I.

**Date:** Tuesday, 16:15, room N0.003

**Distribution of talks:** Tuesday, April 9, 16:15, room N0.008, or by e-mail

**Literature:**

1. S. Lang,  $SL_2(\mathbb{R})$ . Graduate Texts in Mathematics, 105. Springer-Verlag, New York, 1985.
2. A.W. Knap, Representation theory of semisimple groups. An overview based on examples. Princeton University Press, Princeton, NJ, 2001.

**Kontakt:** pfaff@math.uni-bonn.de, mueller@math.uni-bonn.de

**Talks**

1. Representations of compact Lie groups.
2. Induced representations
3. Spherical functions
4. Spherical Fourier transform I
5. Spherical Fourier transform II
6. Classification of the unitary dual I
7. Classification of the unitary dual II
8. Harish-Chandra modules
9. Geometric realization of irreducible unitary representations.
10. Characters
11. The Plancherel theorem I
12. The Plancherel theorem II