Mathematisches Forschungsinstitut Oberwolfach

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Banach Center
INSTITUTE OF MATHEMATICS PAS

Geometry and Topology of Compact Homogeneous Spaces

Banach Center – Oberwolfach Graduate Seminar

Organizers: Stephan Klaus, Oberwolfach
Wilderich Tuschmann, Karlsruhe
Date (ID): 21 - 25 November 2022 (2247c)
Deadline: 1 September 2022

The seminar addresses to graduate students who are interested to deepen not only standard results about simply connected compact homogeneous spaces but also to learn more specialized topics, e.g. on the classification of such spaces, exotic structures and moduli spaces of metrics with special curvature properties.

There is an algorithm to construct all irreducible pairs of compact Lie groups below a given dimension and we will apply this to classify such spaces up to dimension 8. As a surprise, in dimension 7 there are infinitely many exotic spaces, but in dimension 8 there are 20 diffeomorphism types only.

Compact homogeneous spaces do also play a prominent role in global Riemannian geometry and the theory of non-negative and positive sectional curvature. Indeed, many spaces with these curvature properties arise here from taking an isometric quotient of a compact Lie group equipped with a bi-invariant metric, and we will treat the classification of all simply connected, compact positively curved Riemannian homogeneous spaces.

We will also deal with the question what the space of all non-negatively or positively curved metrics on certain given manifolds M looks like, and consider its moduli space, i.e., its quotient by the full diffeomorphism group of M, acting by pulling back metrics. Compact homogeneous spaces have in these studies also been of eminent importance.

See **www.mfo.de/occasion/2247c** for more details, prerequisites and references.

The seminar takes place at the Mathematical Research and Conference Center of the Institute of Mathematics of the Polish Academy of Sciences in Będlewo. Please see the website of the center where you can find basic information (location, travel etc.): **www.impan.pl/en/activities/bedlewo-conference-center/about-center**. In general, travel expenses can not be reimbursed. The number of participants is restricted to about 30 persons.

Applications including title, ID and date of the intended seminar, together with **one pdf-file attached** containing

- full name and address, incl. e-mail address
- short CV and publication list
- present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest

should be **sent by e-mail** via **seminars@mfo.de** until 1 September 2022 to:

Prof. Dr. Matthias Hieber
Mathematisches Forschungsinstitut Oberwolfach
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Practical questions (visa etc.) of approved applicants can be checked with the Banach Center via **office@impan.pl**.