SBF-Seminar "Stratified Spaces" (Teilprojekt C7)

ZEIT:
10.2.2015, 14:30 Uhr - 18:00 Uhr

ORT:
Humboldt-Universität zu Berlin
IRIS Gebäude, Vortragsraum 2.07
Zum Großen Windkanal 6
12489 Berlin-Adlershof

PROGRAMM:

14:30 - 15:00 Kaffee-Pause

15:00 - 15:30

SFB-Vollversammlung

15:30 - 16:30 **Prof. Dr. Markus Banagl (Universität Heidelberg)**

Intersection Spaces, Fibered Scattering Metrics and Hodge Theory
We will start by describing a general homotopy theoretic method that associates to certain singular spaces geometric Poincaré complexes, the so-called intersection spaces. These depend on a perversity, just like Goresky-MacPherson's intersection cohomology, however, the cohomology of intersection spaces turns out to be quite different from intersection cohomology. We will provide motivation and some applications of this approach. Cheeger's Hodge theorem describes intersection cohomology by L2 harmonic forms. In the same spirit, in joint work with Eugenie Hunsicker, we describe the cohomology of intersection spaces by extended weighted L2 harmonic forms with respect to fibered scattering metrics, at least when the neighborhood of the singular stratum can be given a global product structure.

Kontakt:
Humboldt-Universität zu Berlin . Institut für Mathematik
SFB 647 . Unter den Linden 6 . 10099 Berlin
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727
sfb647@math.hu-berlin.de

16:30 - 17:00 Kaffee-Pause

17:00 - 18:00 **Prof. Dr. Jochen Brüning (HU Berlin)**

Whitney and Thom-Mather spaces with applications to spectral theory

The systematic study of stratified spaces was initiated by Hassler Whitney in the 1940's. He defined them as special subsets of smooth manifolds, with a deceptively simple description, and showed their applicability to analytic sets (to be referred to as W-spaces). In the 1960's, René Thom generalized Whitney's approach to abstract spaces, with a view of applications to structurally stable smooth maps. For these spaces he conjectured a lot more structure, decoding Whitney's famous "condition (b)"; Thom sketched proofs of all his assertions which were impossible to understand, though.
In solving the problem of structural stability, John Mather gave eventually a careful and complete proof of all important results conjectured by Thom such that I will refer to them as TM-spaces. In the talk, I will briefly introduce the main notions with some illustrations, and then indicate a proof of the following generalization of Whitney's embedding result for manifolds.
Theorem: Every compact TM-space can be embedded into some Euclidean space in such a way that the image (which inherits the structure of a TM space) is actually a W-space.
Applications to spectral theory arise from considering the top-dimensional stratum in W, which is an open and dense manifold, as a Riemannian manifold with the metric induced from the above embedding. For certain such spaces, we can establish the analogue of Weyl's law for the Laplacian on differential forms.

Kontakt:
Humboldt-Universität zu Berlin . Institut für Mathematik
SFB 647 . Unter den Linden 6 . 10099 Berlin
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727
sfb647@math.hu-berlin.de