

the abdus salam

international centre for theoretical physics

international atomic energy agency

SCHOOL ON HIGH-DIMENSIONAL MANIFOLD TOPOLOGY

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(21 May - 8 June 2001)

Final Programme

VENUE: MAIN LECTURE HALL, MAIN BUILDING

Week 1 (21 - 25 May 2001)

Monday, 21 May

- 8:30 12:00 Registration and administrative formalities
- 14:00 Opening with Professor M.A. Virasoro
- 14:15 15:15 F.T. Farrell (SUNY at Binghamton, U.S.A.) *The Borel Conjecture* - Introduction to high-dimensional manifold topology.
- 15:30 16:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) Surgery Theory - The s-cobordism theorem, Whitehead torsion and Whitehead group.
- 16:45 17:45 M. Davis (Ohio State University, Columbus, U.S.A.) *Exotic aspherical manifolds* - Davis' construction of closed aspherical manifolds using Coxeter groups, where M is not trianguable and $M \cong \mathbb{R}^n$.

Tuesday, 22 May

- 9:30 10:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) Surgery Theory - Normal maps, the π - π -theorem and the geometric formulation of the exact surgery sequence.
- 11:00 12:00 T. Schick (Westfälische Wilhelms-Universität Münster, Germany) Operator algebras and topology - Index theory and C*-algebras and the Baum-Connes Conjecture.

Tuesday, 22 May (continued)

- 14:30 15:30 M. Davis (Ohio State University, Columbus, U.S.A.) *Exotic aspherical manifolds* - Reduction of the Novikov and Borel Conjectures for aspherical complexes to aspherical manifolds.
- 15:45 16:45 F. Quinn (Virginia Tech, Blacksburg, U.S.A.) Pseudo-isotopy spectrum and controlled theory - Geometric modules.

Wednesday, 23 May

- 9:30 10:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) *Surgery Theory* - Algebraic description of *L*-groups and the homotopy theoretic interpretation of normal maps in terms of *G*/*O*.
- 11:00 12:00 I. Hambleton (McMaster University, Hamilton, Canada) Algebraic K- and L-theory and applications to the topology of manifolds -Survey of computations of $K_n(ZG)$ for $n \le 1$ and $L_n(ZG)$ for finite G.
- 14:30 15:30 A. Ranicki (University of Edinburgh, U.K.) *Algebraic Surgery* - Foundations of algebraic surgery.
- 15:45 16:45 F. Quinn (Virginia Tech, Blacksburg, U.S.A.) *Pseudo-isotopy spectrum and controlled theory* - Local contractibility of homeomorphism groups and the thin h-cobordism theorem.
- 18:30 Reception (Cafeteria, Main Building)

Thursday, 24 May

- 9:30 10:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) Surgery Theory - Classification of homotopy spheres.
- 11:00 12:00 I. Hambleton (McMaster University, Hamilton, Canada) *Algebraic K- and L-theory and applications to the topology of manifolds -*The assembly map for finite fundamental groups and surgery obstructions on closed manifolds.
- 14:00 15:00 A. Ranicki (University of Edinburgh, U.K.) *Algebraic Surgery* - The structure set of arbitrary spaces, the algebraic surgery sequence and the total surgery obstruction.
- 15:15 16:15 F. Quinn (Virginia Tech, Blacksburg, U.S.A.) *Pseudo-isotopy spectrum and controlled theory* - Atiyah-Hirzebruch type spectral sequence for the controlled pseudo isotopy spectrum.
- 16:30 17:30 L. Jones (SUNY at Stony Brook, U.S.A.)*Foliated control theory* Foliated control theory for pseudo-isotopies and h-cobordisms.

Friday, 25 May

- 9:30 10:30 L. Jones (SUNY at Stony Brook, U.S.A.) *Foliated control theory* - Surgery theory in the controlled setting.
- 11:00 12:00 I. Hambleton (McMaster University, Hamilton, Canada) *Algebraic K- and L-theory and applications to the topology of manifolds -*A survey of the spherical space form problem.
- 14:30 15:30 A. Ranicki (University of Edinburgh, U.K.) *Algebraic Surgery* - Circle-valued Morse theory and Novikov homology.
- 15:45 16:45 M. Davis (Ohio State University, Columbus, U.S.A.) *Exotic aspherical manifolds* - Gromov's hyperbolization technique and the relation of piecewise flat *CAT*(0)-manifolds to non-positively curved Riemannian manifolds.

Week 2 (28 May - 1 June)

Monday, 28 May

- 9:30 10:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) *Surgery Theory* - Assembly maps in *K*- and *L*-theory, Formulations of Isomorphism Conjectures, Connections to the Borel conjecture.
- 11:00 12:00 L. Jones (SUNY at Stony Brook, U.S.A.) *Foliated control theory* - The relation of the structure set of M and the one of $M \ge D^4$ and the Δ -approach to surgery theory.
- 14:30 15:30 F.T. Farrell (SUNY at Binghamton, U.S.A.) *The Borel Conjecture* - Asymptotic and focal transfer.
- 15:45 16:45 I. Hambleton (McMaster University, Hamilton, Canada) *Algebraic K- and L-theory and applications to the topology of manifolds -*Introduction to bounded *K* and *L*-theory: finite group actions on spheres and non-linear similarity.

Tuesday, 29 May

- 9:30 10:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) *Surgery Theory* - Computations of *K*- and *L*-groups of group rings of certain classes of groups.
- 11:00 12:00 F. Quinn (Virginia Tech, Blacksburg, U.S.A.) Pseudo-isotopy spectrum and controlled theory - Homology manifolds.
- 14:30 15:30 F.T. Farrell (SUNY at Binghamton, U.S.A.) *The Borel Conjecture* - The vanishing of Wh ($\pi_1(M)$) for non-positively curved manifolds using the geodesic flow.
- 15:45 16:45 T. Goodwillie (Brown University, Providence, U.S.A.) Homeomorphism and diffeomorphism groups - Construction of A- theory and the Additivity Lemma.

Wednesday, 30 May

- 9:30 10:30 S. Stolz (University of Notre Dame, U.S.A.) *Manifolds with positive scalar curvature* - Survey on the problem of finding a positive scalar curvature metric on a closed Riemannian manifold.
- 11:00 12:00 T. Schick (Westfälische Wilhelms-Universität Münster, Germany) Operator algebras and topology - A counterexample to the unstable Gromov-Lawson-Rosenberg Conjecture.
- 14:30 15:30 F.T. Farrell (SUNY at Binghamton, U.S.A.) *The Borel Conjecture* - Proof of the Borel Conjecture for non-positively curved manifolds.
- 15:45 16:45 T. Goodwillie (Brown University, Providence, U.S.A.)
 Homeomorphism and diffeomorphism groups Relation of A-theory to pseudo isotopy spaces, Quillen's higher K-theory and Diffeomorphism groups, Igusa's stability theorem for pseudo isotopy spaces.

Thursday, 31 May

- 9:30 10:30 S. Stolz (University of Notre Dame, U.S.A.) *Manifolds with positive scalar curvature* - Stolz' proof of the Gromov-Lawson Conjecture in the simply connected case.
- 11:00 12:00 T. Schick (Westfälische Wilhelms-Universität Münster, Germany) *Operator algebras and topology - L*²-cohomology and the conjecture of Atiyah, Singer and Hopf.
- 14:30 15:30 S. Stolz (University of Notre Dame, U.S.A.) *Manifolds with positive scalar curvature* - The Gromov-Lawson-Rosenberg conjecture and its relation to the Baum-Connes conjecture.
- 15:45 16:45 T. Goodwillie (Brown University, Providence, U.S.A.) Homeomorphism and diffeomorphism groups - Calculations of pseudo isotopy spaces of simply-connected manifolds.

Friday, 1 June

- 9:30 10:30 L. Jones (SUNY at Stony Brook, U.S.A.) *Foliated control theory* - Open manifolds with bounded curvature assumptions.
- 11:00 12:00 F.T. Farrell (SUNY at Binghamton, U.S.A.) *The Borel Conjecture* - Stable calculation of π_n (Top(*M*)) and π_n (Diff(*M*)) for non-positively curved manifolds.

Friday, 1 June (continued)

- 14:30 15:30 S. Stolz (University of Notre Dame, U.S.A.) *Manifolds with positive scalar curvature* - Survey on the problem of finding a positive Ricci curvature metric on a closed Riemannian manifold.
- 15:45 16:45 T. Goodwillie (Brown University, Providence, U.S.A.)
 Homeomorphism and diffeomorphism groups Survey on the proof of the Novikov conjecture in K-theory for finite aspherical complexes by Bökstedt, Hsiang and Madsen.

CONFERENCE

(4 - 8 June 2001)

Monday, 4 June

- 9:30 10:30 S. Stolz (University of Notre Dame, U.S.A.) Concordance classes of positive scalar curvature metrics
- 11:00 12:00 P. Ontaneda (U.F.P., Recife, Brazil) DIFF and PL rigidity on negatively curved manifolds
- 14:30 15:30 W. Lück (Westfälische Wilhelms-Universität Münster, Germany) The relation between the Baum-Connes Conjecture and the Trace Conjecture
- 16:00 17:00 L. Jones (SUNY at Stony Brook, U.S.A.) The Isomorphism Conjecture for the class of infra-solv subgroups

Tuesday, 5 June

- 9:30 10:30 M. Davis (Ohio State University, Columbus, U.S.A.) The topology at infinity of Coxeter groups and buildings
- 11:00 12:00 T. Januszkiewicz (University of Wroclaw, Poland) Hyperbolic Coxeter groups of arbitrary high vcd
- 14:30 15:30 I. Hambleton (McMaster University, Hamilton, Canada) Identifying assembly maps
- 16:00 17:00 E.K. Pedersen (SUNY at Binghamton, U.S.A.) Surgery exact sequence revisited

Wednesday, 6 June

- 9:30 10:30 P.A. Linnell (Virginia Tech, Blacksburg, U.S.A.) Zero divisors, amenable groups and approximating L²-invariants
- 10:45 11:45 T.Schick (Westfälische Wilhelms-Universität Münster, Germany) Approximating L²-signatures by ordinary signatures
- 12:00 13:00 H. Reich (Westfälische Wilhelms-Universität Münster, Germany) On the isomorphism conjecture in algebraic K-theory

Thursday, 7 June

- 9:30 10:30 F. Quinn (Virginia Tech, Blacksburg, U.S.A.) Controlled surgery with Wh-trivial local fundamental groups
- 11:00 12:00 J. Davis (Indiana University, Bloomington, U.S.A.) P-chain spectral sequence and geometric applications
- 14:30 15:30 J. Rognes (University of Oslo, Norway) The Whitehead spectrum of a disc at odd regular primes
- 16:00 17:00 B. Dundas (NTNU, Trondheim, Norway) Good models for new stable homotopy theories
- 17:30: **Problem session**

Friday, 8 June

- 9:30 10:30 S. Ferry (Rutgers University, U.S.A.) Pushing manifolds together
- 11:00 12:00 F. Connolly (University of Notre Dame, U.S.A.) On the calculation of UNIL*
- 14:30 15:30 A. Ranicki (University of Edinburgh, U.K.) Algebraic transversality
- 16:00 17:00 F.T. Farrell (SUNY at Binghamton, U.S.A.) Algebraic K-theory of strongly poly-free groups