(1) **Surname:** Abe
Name: Kojun
Title: On the diffeomorphisms of smooth orbifolds and application to Fuchsian group.
Coauthors:
Abstract: Let M be a connected smooth orbifold. Let $\mathcal{D}(M)$ denote the group of diffeomorphims of M which are isotopic to the identity through diffeomorphims with compact support. We describe the first homology group $H_1(\mathcal{D}(M))$ of $\mathcal{D}(M)$ which is defined by the quotient group of $\mathcal{D}(M)$ by its commutator subgroup. We can apply the result to calculate the first homology of the corresponding automorphism groups of smooth G-manifolds or compact Hausdorff foliations. We can also apply it to the case when a Fuchsian subgroup of $SL(2, \mathbf{R})$ acts on the upper half plane. Then we see that the corresponding first homology of the diffeomorphism group of the orbit space describes the geometric properties around the elliptic singularities and the parabolic singularities of the space.

(2) **Surname:** Čadek
Name: Martin
Title: Obstruction theory on 8-manifolds
Coauthors: Michael Crabb, Jiří Vanžura
Abstract: This work provides a uniform and fairly direct approach to variety of obstruction-theoretic problems on 8-manifolds. We give necessary and sufficient cohomological criteria for the existence of almost complex and almost quaternionic structures in 8-dimensional vector bundles over 8-manifolds and for the reduction of the structure group $SO(8)$ to various groups G by homomorphisms $G \to SO(8)$. The approach is based on a splitting in K-theory.

(3) **Surname:** Castellana
Name: Natàlia
Title: Complex representations of p-local finite groups
Coauthors: Lola Morales
Abstract: In this project we analyze the results of Jackowski and Oliver on the Grothendieck groups of vector bundles over classifying spaces of finite groups. Focusing on a prime p, we emphasize on how these results depend only on the p-local structure of G. Therefore, the proof adapts well to the theory of p-local finite groups and a similiar result holds. In particular, we show how to construct homotopy monomorphisms from classifying spaces of p-local finite groups into classifying spaces of unitary groups. The existence of faithful complex representations is used in the work of Dwyer-Greenless-Iyengar to show that the cochains on classifying spaces are Gorenstein. As a main application, we adapt their proof to the context of p-local finite groups.

(4) **Surname:** Colman
Name: Hellen

Title: Lusternik-Schnirelmann category for orbifolds as groupoids
Coauthors: none
Abstract: The Lusternik-Schnirelmann category of a topological space is a numerical invariant that had been traditionally across the boundary between algebraic topology and dynamics. New applications to several fields showed the relevance of the concept in other unexpected settings. The theory of Lie groupoids provides a convenient language for developing a LS-theory for orbifolds. We develop a new concept of LS-category for Lie groupoids. This notion is an invariant of groupoid homotopy type and it is invariant under Morita equivalence. As a main application we define the LS-category of an orbifold. This number generalizes the classical LS-category for manifolds as well as the more recent LS-categories for foliations. We use equivariant methods to find upper and lower bounds on the orbifold LS-category in terms of the orbifold resolution of the singular set. We obtain a generalization of the classical cohomological lower bound for orbifold LS-category in terms of the Chen-Ruan cohomology.

(5) **Surname:** Delzant
Name: Thomas
Title: Kaehler groups
Coauthors:
Abstract: A Kaehler group is the fundamental group of a compact Kaehler manifold, for instance a complex projective manifold. The main problem is to find which group can (or cannot) be realized as the fundamental group of a Kaehler manifold. We will survey some obstructions coming from combinatorial group theory (cubings, small cancelation theory, group acting on trees, Bieri Neuman Strebel invariant, solvable groups..). (Most results are in a join paper with M. Gromov.)

(6) **Surname:** Deschamps
Name: Sandra
Title: Simply transitive NIL-affine actions on nilpotent Lie groups.
Coauthors: Burde, Dietrich and Dekimpe, Karel
Abstract: As a natural generalization of the usual affine group $\mathrm{Aff}(\mathbb{R}^n) = \mathbb{R}^n \rtimes \mathrm{GL}(n,\mathbb{R})$, we consider the affine group of a connected and simply connected nilpotent Lie group N, which is defined as $\mathrm{Aff}(N) = N \rtimes \mathrm{Aut}(N)$ and which acts on N via ${}^{(m,\alpha)}n = m \cdot \alpha(n)$, for all $m, n \in N$, $\alpha \in \mathrm{Aut}(N)$.

We will focus on simply transitive actions of one simply connected nilpotent Lie group G on another one, say N, via a map $\rho : G \to \mathrm{Aff}(N)$ and refer to such actions as NIL-affine actions.

In the usual affine case (i.e. $N = \mathbb{R}^n$) the notion of a simply transitive affine action has been translated completely towards the Lie algebra level. We show that an analogous translation is available for the much more general simply transitive NIL-affine actions. This allows us to easily present examples and counterexamples in low dimensions.

We then focus on abelian simply transitive NIL-affine actions, i.e. $\rho : \mathbb{R}^n \to \mathrm{Aff}(N)$, as a nice setting next to the affine case. Thereby we discovered that the existence of such an abelian NIL-affine action is equivalent

to the existence of a special Lie-compatible algebra structure on the Lie algebra of N.

We prove that a Lie algebra admitting such a structure, has to be two-step solvable. We prove the existence of such a structure on several classes of two-step solvable Lie algebras. Conversely we also present an example of a three-step nilpotent Lie algebra on four generators without such a structure.

(7) **Surname:** F. Lasheras
Name: Francisco
Title: Some open questions on properly 3-realizable groups
Coauthors: Manuel Cardenas
Title: Some open questions on properly 3-realizable groups
Abstract: We recall that a finitely presented group is properly 3-realizable if it is the fundamental group of a finite 2-polyhedron whose universal cover has the proper homotopy type of a 3-manifold. We present a quick review of proper 3-realizable groups and their relation to well-known conjectures and other properties for finitely presented groups such as semistability at infinity and the WGSC and QSF properties.

(8) **Surname:** Frigerio
Name: Roberto
Title: Rigidity Theorems for hyperbolic manifolds with boundary
Coauthors:
Abstract: Let $n > 2$ and let M, M' be n-dimensional compact hyperbolic manifolds with non-empty geodesic boundary. Building on classical results on quasiconformal homeomorphisms, we show that if the fundamental groups of M, M' are quasi-isometric, then M and M' are commensurable (i.e. they admit a common finite covering), the converse statement being obvious. The same techniques also lead to the natural extension of Mostow rigidity Theorem to hyperbolic manifolds with boundary: namely, we prove that if M, M' are as above and have isomorphic fundamental groups, then they are isometric. Our argument does not depend on Mostow Rigidity for manifolds without boundary, and is inspired by Schwartz's results on cusped hyperbolic manifolds without boundary.

(9) **Surname:** Golasiński
Name: Marek
Title: Homotopy types of orbit spaces and their self-equivalences
Coauthors: D.L. Gonclaves
Abstract: Let G be a finite group with period $2d$ and $X(n)$ an n-dimensional CW-complex with the homotopy type of an n-sphere. We study the automorphism group $\mathrm{Aut}(G)$ for some groups G to compute the number of distinct homotopy types of orbit spaces $X(2dn-1)/\mu$ with respect to free and cellular G-actions μ on all CW-comlexes $X(2dn-1)$. Then, the groups $\mathcal{E}(X(2dn-1)/\mu)$ of self homotopy equivalences are determined. Furthermore, groups G acting freely on the product $X(n_1) \times \cdots \times X(n_k)$ are considered.

(10) **Surname:** Grunewald
Name: Fritz
Title: Linear Representations of the automorphism group of a free group
Coauthors:
Abstract:

(11) **Surname:** Grunewald
Name: Joachim
Title: The Behavior of Nil-Groups under Localization and the Relative Assembly Map
Coauthors:
Abstract: We study the behavior of the Nil-subgroups of K-groups under localization. As a consequence of our results we obtain that the relative assembly map from the family of finite subgroups to the family of virtually cyclic subgroups is rationally an isomorphism. Combined with the equivariant Chern character we obtain a complete computation of the rationalized source of the K-theoretic assembly map that appears in the Farrell-Jones conjecture in terms of group homology.

(12) **Surname:** Hambleton
Name: Ian
Title: Free Actions on Products of Spheres
Coauthors: Ózgún Únlú
Abstract: Which finite groups can act freely and smoothly on a product $S^n \times S^n$ of two spheres ? This talk will describe a approach using surgery theory towards solving this problem (joint work with Ózgún Únlú). Important test cases are the non-abelian p-groups of order p^3 and exponent p, for p an odd prime.

(13) **Surname:** Hausmann
Name: Jean-Claude
Title: Equivariant bundles over split Γ-spaces
Coauthors: Ian Hambeton
Abstract: For Γ and G compact Lie groups, we present, using the method of isotropy representations, a classification of Γ-equivariant principal G-bundles over a space X with a "split" Γ-action (i.e. an action with a section of $X \to X/\Gamma$). This includes equivariant bundle over toric manifolds (where Γ is a torus). The classification is best computable when G abelian but other cases are also interesting, like G of rank one. (joint work with Ian Hambleton)

(14) **Surname:** Herrlich
Name: Frank
Title: Subgroups of the mapping class group related to Teichmueller disks and Schottky space
Coauthors:
Abstract: In this talk I would like to bring together two different types of actions of subgroups of the mapping class group of a closed surface: The first one is related to Schottky space. More precisely, there is a non-normal,

infinitely generated subgroup of the mapping class group such that the quotient of Teichmueller space by the action of this group is the Schottky space. The other one comes from geodesic holomorphic embeddings of the hyperbolic plane into Teichmueller space: If its stabilizer in the mapping class group is a lattice in SL(2,R), its image in the moduli space is an affine algebraic curve (called a Teichmueller curve). In the talk I want to discuss the intersection of such a stabilizer group with the group leading to Schottky space, and draw some geometrical conclusions.

(15) **Surname:** Illman
Name: Soren
Title: Actions of profinite groups and equivariant singular homology
Coauthors:
Abstract: A profinite group is a group which is the inverse limit of finite groups. Each profinite group is compact and totally disconnected. On the other hand it is a well known fact that every totally disconnected, compact topological group is a profinite group.

To begin with we consider the case when the transformation group G is a totally disconnected, locally compact group. In this case any short exact sequence of covariant coefficient systems for G , over some ring R , gives rise to a corresponding long exact sequence of equivariant singular homology groups. We discuss some specific choices of coefficient systems.

As an illustration of this method, to use short exact sequences of appropriate covariant coefficient systems for G , we show that in the case when G is a finite cyclic group of prime order p , we are able to develop P.A.Smith theory and prove P.A.Smith type theorems for singular homolgy and arbitrary topological spaces.

We then consider the case of profinite groups, and in particular the case when the transformation group G is the group of p-adic integers, for some prime p .

As some sort of motivation for this work is of course the Hilbert-Smith conjecture.

(16) **Surname:** IWASE
Name: Norio
Title: Lusternik-Schnirelmann category of SO(10)
Coauthors: Kai Kikuchi
Abstract: We present a mixed theorem of Cone-decomposition and higher Hopf invariants to construct a 'categorical sequence' for the Lie group SO(10) in the sense of R. Fox, whose length is the same as the cup-length.

(17) **Surname:** Kisil
Name: Vladimir
Title: Elliptic, Parabolic and Hyperbolic Geometric Invariants and SL2(R)
Coauthors:
Abstract: The geometric action of SL2(R) on real line by Moebius (linear-fractional) transformations admits analytic extension to upper-half plane. This is traditionally done with the help of complex numbers and represent elliptic geometry. However such an extension can be done for hyperbolic

and parabolic cases as well with the appropriate Clifford algebra. We study all these three actions within the Erlangen program approach. The natural SL2(R)-invariant objects are cycles (circles, parabolas and hyperbolas in the corresponding cases) and lifting of SL2(R) action to the extended cycles space linearises it. Moreover classical matrix invariants of cycles generate interesting invariant properties in respective geometries which reveals many surprising discoveries. For example there are meaningful centres of parabolas and foci (different from centres!) of circles. The full paper available at http://arxiv.org/abs/math.CV/0512416.

(18) **Surname:** Kreck
Name: Matthias
Title: What is more likely symmetric or asymmetric manifolds?
Coauthors:
Abstract:

(19) **Surname:** Kuroki
Name: Shintaro
Title: GKM-graph and its equivariant cohomology
Coauthors:
Abstract: Motivated by a result of Goresky-Kottwitz-MacPherson, Guillemin-Zara introduced the notion of a GKM-graph $\mathcal{G}$ and defined its (equivariant) cohomology which we denote by $H_T^*(\mathcal{G})$. An important fact is that if $\mathcal{G}$ is associated with an equivariantly formal T-space M such as a toric manifold where T is a torus group, then $H_T^*(\mathcal{G})$ is isomorphic to the equivariant cohomology $H_T^*(M)$ of M.

Maeda-Masuda-Panov introduced the notion of a torus graph as a combinatorial counterpart of a torus manifold introduced by Hattori-Masuda. A torus graph is not necessarily a GKM-graph but the equivariant cohomology can be defined similarly to a GKM-graph. They proved that the equivariant cohomology of a torus graph is isomorphic to the face ring of a simplicial poset dual to the torus graph. It is also true that if a torus graph $\mathcal{G}$ is associated with an equivariantly formal torus manifold M, then $H_T^*(\mathcal{G})$ is isomorphic to $H_T^*(M)$.

In this talk we will introduce the notion of a hypertorus graph which is not a GKM-graph and a torus graph but the equivariant cohomology is defined similarly and we will show its equivariant cohomology ring is isomorphic to a ring which is defined by some combinatorial information of a hypertorus graph in some case. For example the graphs $\mathcal{G}$ associated with cotangent bundles over a toric manifold or hypertoric varieties are hypertorus graphs, in these cases the equivariant cohomology of a space is isomorphic to $H_T^*(\mathcal{G})$ and it is also isomorphic to a ring which is defined by some combinatorial information of a hypertorus graph.

(20) **Surname:** Masuda
Name: Mikiya
Title: Equivariant cohomology and toric manifolds
Coauthors:

Abstract: Equivariant cohomology $H^*_G(M)$ is not only a ring but also an algebra over $H^*(BG)$. We will show that Theorem. Two (quasi)toric manifolds are equivariantly diffeomorphic if (and only if) their equivariant cohomology algebras are isomorphic. Corollary. Two (quasi) toric manifolds are equivariantly diffeomorphic if (and only if) they are equivariantly homotopic.

(21) **Surname:** Millionschikov
Name: Dmitry
Title: INVARIANT SYMPLECTIC AND AFFINE STRUCTURES ON NILPOTENT LIE GROUPS
Coauthors:
Abstract: We study left-invariant symplectic and affine structures on nilpotent Lie groups that correspond to filiform Lie algebras – nilpotent Lie algebras of the maximal length of the descending central sequence. Symplectic filiform Lie algebras in large dimensions can be described as special deformations of two series of graded filiform Lie algebras. We study deformations of one of them: 'finite positive part' of Virasoro algebra, i.e. a graded Lie algebra with basis $e_1, \ldots, e_n$ structure relations of the following form: $[e_i, e_j] = (j-i)e_{i+j}, i + j \leq n$. For dimensions $n \geq 16$ the moduli space $\mathcal{M}_n$ of these deformations can be identified with the weighted projective space $KP^4(n-11, n-10, n-9, n-8, n-7)$ and for even dimensions n the subspace of symplectic Lie algebras is determined by one linear equation. The relation to the problem of existence of affine structure is discussed.

(22) **Surname:** Monod
Name: Nicolas
Title: From geometric splitting to arithmeticity
Coauthors:
Abstract: We prove a superrigidity theorem for actions of irreducible lattices on CAT(0) spaces. Since such spaces generalize for instance symmetric spaces and buildings, one obtains in particular a new and self-contained proof of Margulis' superrigidity theorem for uniform irreducible lattices in non-simple groups. As an application, there is a "arithmeticity/non-linearity" alternative.

The proofs rely on simple geometric arguments, including a splitting theorem which can be viewed as an infinite-dimensional (and singular) generalization of the Lawson-Yau/Gromoll-Wolf theorem.

(23) **Surname:** Morimoto
Name: Masaharu
Title: A counter example to Laitinen's Conjecture
Coauthors:
Abstract: Many authors studied Smith equivalent representations for finite groups. Observing their results, E. Laitinen conjectured that non-isomorphic Smith equivalent real$G$-modules exist if a_G, the number of real conjugacy classes of elements not of prime power order in G, is greater than or equal to 2. This paper shows that in the case $G = \mathrm{Aut}(A_6)$, $a_G = 2$ but two Smith equivalent real G-modules are isomorphic.

(24) **Surname:** Mramor Kosta
Name: Neza
Title: Coincidence sets of p-group actions
Coauthors:
Abstract: For a p-group G, we will consider some cohomological conditions which force a map f from a G-space X to a space Y to be constant on at least one orbit of the action.

(25) **Surname:** Nagasaki
Name: Ikumitsu
Title: Isovariant maps of free C_n-homology spheres to representation spheres
Coauthors: F. Ushitaki
Abstract: From the viewpoint of equivariant topology, the Borsuk-Ulam theorem, originally proved by K. Borsuk, is thought of as a nonexistence result of equivariant maps. We consider a Borsuk-Ulam type theorem in the isovariant setting, and show existence or nonexistence results on isovariant maps of free C_n-homology spheres to representation spheres. Moreover we classify isovariant homotopy classes in terms of multidegree. References [1] I. Nagasaki, Isovariant Borsuk-Ulam results for pseudofree circle actions and their converse, Trans. Amer. Math. Soc. 358 (2006), 743-757. [2] I. Nagasaki and F. Ushitaki, Isovariant maps from free C_n-manifolds to representation spheres, in preparation.

(26) **Surname:** Oliver
Name: Bob
Title: Extensions of p-local finite groups
Coauthors: Joana Ventura
Abstract:A p-local finite group consists of a triple $(S, \mathcal{F}, \mathcal{L})$, where S is a finite group, $\mathcal{F}$ is a category whose objects are the subgroups of S and which is modeled on conjugacy relations in a finite group with Sylow p-subgroup S, and $\mathcal{L}$ is a category similar to $\mathcal{F}$ with enough extra information so that $|\mathcal{L}|^\wedge_p$ has many of the properties of the p-completed classifying spaces of finite groups. Any finite group G defines a p-local finite group $(S, \mathcal{F}_S(G), \mathcal{L}^c_S(G))$, where $S \in Syl_p(G)$ and $|\mathcal{L}^c_S(G)|^\wedge_p \simeq BG^\wedge_p$. When $(S, \mathcal{F}, \mathcal{L})$ does not arise from a finite group in this way, we call it "exotic".

After giving a survey of this background material, I will describe joint work with Joana Ventura, where we study extensions of p-local finite groups of the form

$$1 \to A \longrightarrow (S, \mathcal{F}, \mathcal{L}) \longrightarrow (S, \mathcal{F}, \mathcal{L}) \to 1\,,$$

where A is an abelian p-group. When A is central, then $(S, \mathcal{F}, \mathcal{L})$ comes from a group if and only if $(S, \mathcal{F}, \mathcal{L})$ does. If, however, A is not central, then it is possible to have such an extension where $(S, \mathcal{F}, \mathcal{L})$ comes from a group and $(S, \mathcal{F}, \mathcal{L})$ is exotic. This is closely related to the examples which will be described by Albert Ruiz in his talk.

(27) **Surname:** Otera
Name: Daniele
Title: The geometric simple connectivity for groups
Coauthors: L. Funar

Abstract: A finitely presented group is (weakly) geometrically simply connected (wgsc) if it is the fundamental group of a manifold of dimension at least 5 whose universal covering is geometrically simply connected i.e. it has a handlebody decomposition without 1-handles (or any compact subspace is contained in a simply connected submanifold). We show that this condition is equivalent to Brick's qsf property. We further observe that a number of standard constructions in group theory yield wgsc groups and apply these to specific examples.

(28) **Surname:** Pavesic
Name: Petar
Title: Semi-perfectness and unique factorization in homotopy theory
Coauthors:
Abstract: In this talk we are going to explain how the algebraic theory of semi-perfect rings and near-rings can be used to prove unique factorization theorems in stable and unstable homotopy theory.

(29) **Surname:** Pitsch
Name: Wolfgang
Title: Isolated points in the space of groups
Coauthors: Yves de Cornulier and Luc Guyot
Abstract: We investigate the isolated points in the space of finitely generated groups. We give a workable characterization of isolated groups and study their hereditary properties. Various examples of groups are shown to yield isolated groups. We also point out a connection between isolated groups and solvability of the word problem.

(30) **Surname:** Porti
Name: Joan
Title: Geometrization of three-orbifolds
Coauthors:
Abstract: In 1981 Thurston stated the geometrization of three dimensional orbifolds, suggested a proof, but some technical parts, namely collapses of cone manifolds, where not understood until recently. I will describe the main points of the proof and explain which corollaries are also consequence of the proof of geometrization of three-manifolds by Perelman, and which are not.

(31) **Surname:** Reich
Name: Holger
Title: Algebraic K-theory and hyperbolic groups
Coauthors: Arthur Bartels, Wolfgang Lück
Abstract: The algebraic K-theory of a group ring plays an important role in geometric topology. The Farrell-Jones conjecture predicts that for an arbitrary group the K-theory can be computed once it is known for small subgroups of the given group, i.e. for finite or virtually cyclic groups.

We prove the K-theoretic Farrell-Jones conjecture for hyperbolic groups and more generally for arbitrary subgroups of finite products of such groups. This implies for example the Bass conjecture for such groups and in the torsionfree case the vanishing of the Whitehead group.

(32) **Surname:** Ruiz
Name: Albert
Title: Exotic fusion subsystems of the General Linear Group
Coauthors:
Abstract: The concept of p-local finite group arise in the work of Broto-Levi-Oliver as a generalization of the classical concept of finite group studied at a fixed prime p. One way of getting examples of p-local finite groups is considering a fixed finite group G, p a prime dividing the order of G and S a Sylow p-subgroup. In these cases we use the group structure of G to obtain a p-local finite group over S associated to G. We are particularly interested in the examples which cannot be constructed in this way, which are called exotic p-local finite groups. In this talk we will see the classification of the saturated fusion subsystems of index prime to p of the general linear group over $\mathbb{F}_q$, where q is a prime power prime to p. This classification gives examples of exotic p-local finite groups corresponding to saturated fusion subsystems of a finite group.

(33) **Surname:** Sánchez García
Name: Rubén
Title: Equivariant K-theory for SL(3,Z)
Coauthors:
Abstract: The Baum-Connes conjecture identifies two objects associated to a discrete group G, one analytical and one topological. The former is the K-theory of the reduced C^*-algebra of G, and the latter is the equivariant K-theory of certain classifying space of G. We present the calculation of the topological side of Baum-Connes for $SL(3,\mathbb{Z})$, via the computation of its Bredon homology.

(34) **Surname:** SCHERER
Name: Jerome
Title: Generalized orientations and the Bloch invariant
Coauthors: Michel Matthey, Wolfgang Pitsch
Abstract: Let G be the fundamental group of a 3-dimensional hyeperbolic manifold M of finite volume. Goncharov, and Neumann and Yang have constructed an invariant in the Bloch subgroup of scissors congruences of hyperbolic space. Later Cisneros-Molina and Jones have attempted to lift this invariant in $K_3(C)$. The common point in these approaches is that the construction starts from the fundamental class in ordinary homology. We notice that M is also orientable with respect to any generalized homology theory, for instance stable homotopy. Starting with such a generalized orientation we show that when M is compact the Bloch invariant lifts uniquely to an invariant in $K_3(C)$, and when M is non-compact there are Q/Z possible choices of lifts which can be identified in the Bloch-Wigner exact sequence. This suggests that one cannot lift canonically the Bloch invariant in general.

(35) **Surname:** Schmithuesen
Name: Gabriela
Title: Veech groups and Teichmueller curves of origamis

Coauthors:
Abstract: A Veech group is a discrete subgroup of $SL(2,R)$ that is associated to a Riemann surface with a translation structure. Such a translation structure defines under 'good conditions' a special curve in the moduli space M_g, called Teichmueller curve. Whether this happens or not can be detected from the Veech group. One has even more: the Veech group is known to (almost) determine the Teichmueller curve.
I study particular Teichmueller curves, sometimes called origami curves: They are defined by a translation structure, which is the pull back of a covering to an elliptic curve, ramified over at most one point. In this case the Veech group is a subgroup of $SL(2,Z)$.
Using the natural projection from the automorphism group of the free group F_2 on two generators to $SL(2,Z)$, I prove the following characterization: Veech groups of origamis are precisely the images of subgroups $G(U)$ of $Aut(F_2)$, which stabilize a finite index subgroup U of F_2. This makes it e.g. possible to calculate them explicitly.
With the help of the characterization I prove that many congruence subgroups of $SL(2,Z)$ and infinitely many non congruence groups occur as Veech groups.

(36) **Surname:** Smrekar
Name: Jaka
Title: Periodic homotopy and conjugacy idempotents
Coauthors:
Abstract: An endomorphism f in some category is a *periodic idempotent* if for some $r \geq 0$ and $p > 0$ the iterates f^r and f^{r+p} coincide. We are interested in the free homotopy category of CW complexes and the category of groups with morphisms conjugacy classes of group homomorphisms. The corresponding periodic idempotents are called *periodic homotopy idempotents* and *periodic conjugacy idempotents*.

For a periodic homotopy idempotent f on the CW complex Z Geoghegan and Nicas defined the *rotation index* $RI(f)$. They proved that for $r = p = 1$, the homotopy idempotent f splits if and only if $RI(f) = 1$. It is a classical result that f splits if and only if the induced conjugacy idempotent $f_\#$ on the fundamental group splits up to conjugacy. Moreover, there is a universal nonsplitting conjugacy idempotent defined on the Thompson group.

For $r = 0$ and arbitrary p, Geoghegan and Nicas proved that the index $RI(f)$ divides p^2.

We extend the above results in a suitable way to arbitrary p and r. We relate also the general case to splitting phenomena and we exhibit universal examples on the generalized Thompson groups.

(37) **Surname:** Talelli
Name: Olympia
Title: On groups of type PH
Coauthors:
Abstract: We define a group G to be of type PH if it has the prorerty that for every ZG module M, proj.dim.of M over ZG is finite if and only if proj. dim. of M over ZH is finite for every finite subgroup H of G. We

discuss results supporting our conjecture which claims that the groups of type PH are precisely the ones that admit a finite dimentional classifying space E_G for the family of the finite subgrous of G.

(38) **Surname:** Terzic
Name: Svjetlana
Title: On loop space hopmology of some homogeneous spaces
Coauthors:
Abstract: Minimal model theory together with Milnor-Moore theoprem provide an algebraic model for the computation of a rational loop space homology algebras of simply connected spaces. In this talk we are going to present how this model can be applied to some homogeneous spaces to obtain an explicit formulas.

(39) **Surname:** Vavpetic
Name: Ales
Title: Grope Groups
Coauthors: Katsuya Eda, Matija Cencelj
Abstract: Let S be a subset of the set $Seq(\mathbb{N})$ of finite sequences in $\mathbb{N}$ satisfying: $\emptyset \in S$ and for every $s \in S$ the set $\{i \in \mathbb{N} : si \in S\}$ is even. Let $E^S_m = \{c^S_s : \text{length}(s) = m, s \in S\}$ and let $F^S_m = \langle E^S_m \rangle$ be the free group generated by E^S_m. Define a homomorphism $e^S_m : F^S_m \to F^S_{m+1}$ as $e^S_m(c^S_s) = [c^S_{s0}, c^S_{s1}] \cdots [c^S_{s\,2k-2}, c^S_{s\,2k-1}]$ where $\{i \in \mathbb{N} : si \in S\} = \{c^S_{s0}, \ldots, c^S_{s\,2k-1}\}$. We call the direct limit $G^S = \varinjlim(F^S_m, e^S_m : m \in \mathbb{N})$ a grope group (since its classifying space is an open infinite grope). The minimal grope group M is the grope group G^{S_0}, where for every $s \in S_0$ the set $\{i \in \mathbb{N} : si \in S_0\}$ has 2 elements. We prove that there exists a monomorphism from the minimal grope group M to a grope group G^S if and only if there exists $s \in S$ such that $\{t \in Seq(\mathbb{N}) : st \in S\}$ is equal to S_0. In particular, not all grope groups are isomorphic.

(40) **Surname:** Vogtmann
Name: Karen
Title: Outer space for right-angled Artin groups
Coauthors: Ruth Charney
Abstract: Right-angled Artin groups interpolate between free groups and free abelian groups, and hence their outer automorphism groups interpolate between $Out(F_n)$ and $GL(n, Z)$. The group $Out(F_n)$ can be usefully represented as symmetries of an 'outer space' of actions of F_n on trees, and $GL(n, Z)$ as symmetries of a space of actions of Z^n on R^n. We define an analogous outer space for outer automorphism groups of right-angled Artin groups in the case when the associated graph has no triangles.

(41) **Surname:** Yagita
Name: Nobuaki
Title: Complex cobordism of BSO(n)
Coauthors: Kouchi Inoue

Abstract: In this paper, we compute MU(BSO(2n)) and show that it is generated as an MU-algebra by Conner-Floyd Chern classes and one 2n-dimensional element. For the case BO(m) are still studied by W.S.Wilson. We get the result by using (equivariant) stratification methods introduced to compute Chow rings by Guillot, Molina, Vessozi and Vistoli.