

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

Report No. 32/2010

DOI: 10.4171/OWR/2010/32

Cohomology of Finite Groups: Interactions and Applications

Organised by
Alejandro Adem, Vancouver
Jon F. Carlson, Athens
Henning Krause, Bielefeld

July 25th – July 31st, 2010

ABSTRACT. The cohomology of finite groups is an important tool in many subjects including representation theory and algebraic topology. This meeting was the third in a series that has emphasized the interactions of group cohomology with other areas.

Mathematics Subject Classification (2000): 20Jxx, 20Cxx, 55Nxx, 57Nxx.

Introduction by the Organisers

The workshop brought together mathematicians from several areas of algebra and topology. The common theme was the use and application of techniques from the cohomology theory of finite groups. There were 53 participants from eleven different countries at the meeting. This included several graduate students and postdocs. Three of the participants were invited speakers at the International Congress of Mathematicians in Hyderabad, India, a month after the Oberwolfach workshop. Two spoke in the algebra section of the ICM and the third in the topology section.

This was the third Oberwolfach workshop in the series with the same title. The previous two had been in 2000 and 2005. The emphasis of this meeting was strongly on applications and interactions with subjects as diverse as homotopy theory, transformation groups, representation theory of finite groups and group schemes, triangulated categories and algebraic geometry, number theory and commutative algebra.

A few of the highlights included an introduction to generalized rank varieties and modules of constant Jordan type by Julia Pevtsova. Dave Benson showed us how the geometry of vector bundles can be used to obtain information on representation theory. Bernhard Hanke described a homotopy Euler characteristic that provides an upper bound on the free p -rank of symmetry of a finite complex. Ergün Yalçın connected fusion systems for finite groups with the study of group actions on products of spheres. Dave Hemmer told how topological and algebraic methods can be combined to prove that there are large gaps in the cohomology of Young modules over symmetric groups. Fred Cohen described an approach to understanding the homotopy of spaces of representations, in particular commuting elements in a Lie group. After a quick introduction into the geometry of tensor triangulated categories, Paul Balmer addressed the natural question of descent and presented some applications in the representation theory of groups. The Brauer construction from group representations has been adapted by Peter Symonds to study the fixed-point space of group action on varieties. Jesper Grodal proved a bound on the p -rank of the group of homotopy self-equivalences of a finite simply connected complex. There was some discussion of the classification of localizing subcategories of the stable module category of a finite group, by Benson, Henning Krause and Srikanth Iyengar.

The schedule allowed much time for lively discussions. There were 23 lectures, several by younger members of the group. Many of the participant joined the standard hike to St. Roman on Wednesday afternoon, in spite of somewhat unfavorable weather. On Thursday evening, the group was treated to a concert organized by Peter Webb, featuring excellent performances on piano, violin and flute by several of the conference participants. As usual, the friendly and stimulating atmosphere of Oberwolfach contributed to a lively and exciting conference.