

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

Report No. 21/2012

DOI: 10.4171/OWR/2012/21

Toric Geometry

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April 15th – April 21st, 2012

ABSTRACT. Toric Geometry plays a major role where a wide variety of mathematical fields intersect, such as algebraic and symplectic geometry, algebraic groups, and combinatorics. The main feature of this workshop was to bring people from these area together to learn about mutual, possibly up till now unnoticed similarities in their respective research.

Mathematics Subject Classification (2000): 14M25, 53D37, 52B20.

Introduction by the Organisers

The workshop “Toric Geometry” was attended by 53 people including many young participants. The idea was to shed light on the subject from many different points of view – toric geometry involves methods from algebraic and symplectic geometry, algebraic groups, and discrete mathematics.

A major driving force combining all these directions is still provided by the different flavours of mirror symmetry. So it is quite natural that related subjects like Lagrangians in symplectic manifolds showed up in many talks (Abreu, Woodward, Ono, Lau, Sjamaar).

A very common feature that appeared in many talks was the attempt to weaken assumptions in the setting of algebraic or symplectic toric varieties. This was done by either considering higher complexities of torus actions, or by relaxing the demands on the symplectic forms, or by studying non-algebraic situations or more general algebraic groups than just tori (Timashev, Hausen, Süß, Knop, Tolman, Holm, Masuda).

Polyhedral methods and their interplay with resolutions and deformations or degenerations is a classical feature of toric geometry. Recently this was extended

to non toric varieties by the notion of Okounkov bodies. Talks widely fitting into this area were given by Kiritchenko, Teissier, Tevelev, Kaveh, Ilten, Nill.

Finally, there were talks dealing with homological, K-theoretical or derived methods (Craw, Anderson, Ploog) or talks with the classical topics of syzygies or projective duality (Schenck, di Rocco).

The informal discussions in addition to the talks brought algebraic and symplectic geometers together – for instance the different languages for studying complexity one T -varieties were mutually recognized. Moreover, on Wednesday night a special session of short talks took place. Everybody was allowed to speak, but each contribution was strictly limited to ten minutes plus discussion. This was adroitly moderated by Christian Haase and became a very successful and energetic evening.

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