

# Lie Group and Representation Theory Seminar

Date: October 12 (Tue), 2004, 16:30–17:30  
Place: RIMS Room 402  
Speaker: Bernhard Krötz (RIMS)  
Title: Lagrangian submanifolds and moment convexity

## Abstract:

Consider a Hamiltonian torus action  $T \times M \rightarrow M$  on a compact and connected symplectic manifold  $M$ . Associated to this data is the moment map  $\Phi : M \rightarrow \mathfrak{t}^*$ . It is a remarkable structural fact, due to Atiyah and Guillemin-Sternberg, that the image of  $\Phi$  is a convex polytope. The AGS-theorem was generalized by Duistermaat who showed that if  $Q$  is Lagrangian submanifold of  $M$  which arises as the fixed point set of a  $T$ -compatible anti-symplectic involution, then  $\Phi(Q) = \Phi(M)$  is a convex polytope.

In this talk we present a result which extends Duistermaat's Theorem in the sense that it substantially enlarges the class of Lagrangians  $Q \subset M$  for which  $\Phi(Q) = \Phi(M)$  holds. As an application one can give now symplectic proofs of all known convexity statements in Lie theory. As a prominent new example we will outline a symplectic proof of Kostant's non-linear convexity theorem.

The talk will be preceded by a 60 min introductory lecture on Hamiltonian torus actions.

## References

- [1] B. Krötz and M. Otto, *Lagrangian submanifolds and moment convexity*, Trans. Amer. Math. Soc., to appear.
- [2] —, A refinement of the complex convexity theorem via symplectic techniques, Proc. Amer. Math. Soc., to appear.

\*\*\*\*\*

Prior to this seminar, Kroetz will give an introductory lecture on Hamiltonian torus actions from 15:00-16:00 in the same room.

セミナー連絡先： 数理解析研究所 小林俊行