



JACOBS  
UNIVERSITY

# Mathematics Colloquium at Jacobs University Bremen

ALEXANDER TIKHOMIROV

(MPI für Mathematik, Bonn; ICTS)

will speak on

*Vector Bundles on ind-Grassmannians*

**Date:** Monday, April 21, 2008

**Time:** 17:15

**Place:** Lecture Hall Research II, Jacobs University

**Abstract:**

As it is known after Barth-Van de Ven-Tyurin, any vector bundle on an ind-projective space  $\mathbb{P}^\infty$  (i.e., an inductive limit  $\{\mathbb{P}^1 \hookrightarrow \dots \hookrightarrow \mathbb{P}^n \hookrightarrow \mathbb{P}^{n+1} \hookrightarrow \dots\}$  of projective spaces) is a direct sum of line bundles. It was proved by Donin and Penkov in 2003 that any vector bundle on a twisted ind-projective space (i.e., an inductive limit of projective spaces with nonlinear embeddings  $\mathbb{P}^n \hookrightarrow \mathbb{P}^{n+1}$  for each  $n$ ) is trivial. The simplest example of a homogeneous ind-variety beyond an ind-projective space is an ind-Grassmannian

$$\lim_{\rightarrow} G(k_i, n_i) = \{\dots \hookrightarrow G(k_i, n_i) \hookrightarrow G(k_{i+1}, n_{i+1}) \hookrightarrow \dots\}.$$

The case of rank 1 bundles on ind-Grassmannians is clear. In this talk we present the results of our joint work with Ivan Penkov about vector bundles on ind-Grassmannians. In certain cases we give the complete answer about the structure of these bundles. The answer depends on whether an ind-Grassmannian is twisted or not. In particular, we prove that any rank 2 vector bundle on a twisted ind-Grassmannian is trivial. We also present the approach to this problem for vector bundles of higher rank.

**Colloquium Tea** at ca. 16:45 in the Tea Room of Research II, close to the lecture hall. Everybody is welcome!

M. STOLL