SFB-Seminartag

TIME:
16 May 2006, 15:00 - 18:00

LOCATION:
Humboldt-Universität zu Berlin
Unter den Linden 6
Hauptgebäude, Hörsaal 3075
10099 Berlin

PROGRAM:

15:00 - 16:00 **Prof. Dr. Christian Bär (Univ. Potsdam)**

Deligne cohomology, the B-field, and variational problems
I will explain how Deligne cohomology generalizes classical gauge theory with abelian structure groups. Such higher degree gauge theories occur e.g. in string theory: The B-field is an example of a higher connection with curvature 3-form H, the field strength. The B-field
contribution to the effective string action is actually its holonomy. It will be shown how Deligne cohomology gives rise to functionals whose critical points are (immersions of) submanifolds with prescribed mean curvature.

16:30 - 17:30 **Dr. Johannes Huebschmann (Leipzig)**

Singular Poisson-Kähler geometry of stratified Kähler spaces
A stratified K¨ahler space is a stratified symplectic space together with a complex analytic structure
which is compatible with the stratified symplectic structure; in particular each stratum is a K¨ahler
manifold in an obvious fashion. The notion of stratified K¨ahler space establishes an intimate relationship
between nilpotent orbits, singular reduction, invariant theory, reductive dual pairs, Jordan triple systems, symmetric domains, and

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pre-homogeneous spaces. The purpose of the talk is to illustrate the significance of stratified K¨ahler spaces.
Examples of stratified K¨ahler spaces abound. The closure of a holomorphic nilpotent orbit carries a normal K¨ahler structure. Symplectic reduction carries a K¨ahler manifold to a normal stratified K¨ahler space in such a way that the sheaf of germs of polarized functions coincides with the ordinary sheaf of germs of holomorphic functions. Projectivization of holomorphic nilpotent orbits yields exotic stratified K¨ahler structures on complex projective spaces and on certain complex projective varieties including complex projective quadrics. Other examples come from certain moduli spaces of holomorphic vector bundles on a Riemann surface and variants thereof; in physics language, these are spaces of conformal blocks. Still other physical examples are reduced spaces arising from angular momentum.
In the world of singular Poisson-K¨ahler geometry, reduction after quantization coincides with quantization after reduction: For a stratified symplectic space, the concept of stratified polarization, which is defined in terms of an appropriate Lie-Rinehart algebra, encapsulates polarizations on the strata and, moreover, the behaviour of the polarizations across the strata. Exploiting the notion of stratified K¨ahler space, one can prove that, given a K¨ahler manifold, reduction after quantization coincides with quantization after reduction in the sense that not only the reduced and unreduced quantum phase spaces correspond but the invariant unreduced and reduced quantum observables as well.

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