

Institut Ruđer Bošković
ZAVOD ZA TEORIJSKU FIZIKU
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SEMINAR ZAVODA ZA TEORIJSKU FIZIKU
(Zajednički seminari Zavoda za teorijsku fiziku,
Zavoda za eksperimentalnu fiziku i Zavoda za teorijsku fiziku PMF-a)

Representations of coherent state Lie algebras by holomorphic differential operators

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Abstract:

The coherent states (CS), invented by Erwin Schrödinger in the first days of Quantum Mechanics, are a powerful bridge between the Classical and Quantum Mechanics. Here we shall present some applications of the group theoretic generalization of Perlmov's CS in representations of a class of groups on homogeneous spaces. It is well known that the creation and annihilation operators of the canonical commutation relations $[a, a^+] = 1$ admit the realization by the differential operators $a \rightarrow \frac{\partial}{\partial z}$, $a^+ \rightarrow z$. We shall present realization of CS-algebras by first order holomorphic differential operators with polynomial coefficients defined on the Kähler orbits of the corresponding groups. The presentation is based on several of my papers which can be find in arXiv: math.DG. Here are some topics of my presentation: CS, CS-representations, CS-vectors; the symmetric Fock space as reproducing Kernel Hilbert space. Representations of Lie algebras of CS-groups by differential operators: representations on space of orbits with Kähler structure generated by semisimple Lie groups; an example of representations on non-symmetric coset manifolds; holomorphic representations of the Lie algebra semidirect sum of the Heisenberg Lie algebra and corresponding real symplectic algebra.

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