SFB-Seminar

ZEIT:
29.5.2012, 16:00 Uhr - 19:00 Uhr

ORT:
Humboldt-Universität zu Berlin
Institut für Physik (Lise-Meitner-Haus)
Gerthsen-Hörsaal 1.201
Newtonstr. 15
12489 Berlin

PROGRAMM:

16:00 - 17:00 **Prof. Dr. Andreas Juhl**

The structure of GJMS-operators and Q-curvatures
The significance of the Yamabe operator is widely known in conformal differential geometry. Moreover, some high-order conformally invariant generalizations of this operator are well-known since more than twenty years. In fact, such operators were constructed by Graham, Jenne,Mason and Sparling in a seminal paper by an application of the Fefferman-Graham ambient metric, and are now usually referred to as the GJMS-operators. In recent years, these operators played an increasingly important role in mathematics and theoretical physics. In particular, they gave rise to the notion of Branson's Q-curvature, and much recent work has been devoted to its understanding. Despite these developments, the insights into the structure of (and formulas for) these operators (and Q-curvatures) were poor.
In the lecture I will give an introduction to these questions and will describe some of the new tools which allowed to reveal a part of the hidden structures in the sequence of the GJMS-operators. In particular, we found how these operators can be described in terms of a sequence of remarkable geometric second-order operators and that the sequence of Q-curvatures have an intrinsic recursive structure. On a very basic level, the new techniques are inspired by

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representation theory and aspects of the AdS/CFT-duality.

17:30 - 18:30 **Marc Henneaux**

What Can We Learn From Three-dimensional Gravity?
Three-dimensional Einstein gravity has no local dynamical degree of freedom. Yet, it is far from being trivial when the cosmological constant is negative. (i) It admits black hole solutions. (ii) It possesses remarkable asymptotic properties at infinity where an infinite-dimensional symmetry algebra emerges. These unique features make three-dimensional gravity a perfect "theoretical laboratory" in which to explore the conceptual issues related to (i) and (ii) in a simpler context. The talk will not only discuss three-dimensional gravity assuming no previous knowledge on the subject, but will also provide background information on why (i) and (ii) are connected with some of the deepest current challenges in physics. If time permits, the extension of Einstein gravity to include consistently interacting higher spin gauge fields (another long-standing challenge of theoretical physics) will also be addressed in the three-dimensional context.

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