



## Seminar "Topics in Geometric Analysis"

### ZEIT:

17.7.2014, 16:15 Uhr - 18:45 Uhr

### ORT:

Freie Universität Berlin, Fachbereich Mathematik und Informatik  
Arnimallee 6, Raum 031

### PROGRAMM:

16:15 - 17:15 **Claus Gerhardt (Heidelberg)**

#### **A unified quantum theory: gravity interacting with Yang-Mills and spinor fields**

We quantize the interaction of gravity with Yang-Mills and spinor fields, hence offering a quantum theory incorporating all four fundamental forces of nature. Using canonical quantization we obtain solutions of the Wheeler-DeWitt equation in a vector bundle and the method of second quantization leads to a symplectic vector space  $(V, \mathbb{I} \cdot \#137;)$  and a corresponding CCR representation for the bosonic components and a CAR relation for the fermionic part. The solution space of the Wheeler-DeWitt equation is invariant under gauge transformations and under isometries in the spacelike base space  $S_0$  of a given Riemannian metric  $\mathbb{I} \bullet ij$ . We also define a net of local subalgebras which satisfy four of the Haag-Kastler axioms.

17:15 - 17:45 Kaffeepause

17:45 - 18:45 **Apostolos Damialis (FU)**

#### **Plateau's laws for diffused interfaces**

We present some old and new results on the problem of deriving Plateau's laws at junctions of diffused interfaces via the vector-valued Allen-Cahn equation. We begin with the simplest case of a triple junction on the plane and present in detail a rigorous derivation in the case of triple and quadruple junctions in three-dimensional space.

### Kontakt:

Humboldt-Universität zu Berlin . Institut für Mathematik  
SFB 647 . Unter den Linden 6 . 10099 Berlin  
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727  
sfb647@math.hu-berlin.de

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As a conclusion, we discuss some aspects of the related problem of deriving Plateau's laws from static balance of forces relations.

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