



## SFB-Seminartag

### ZEIT:

27.6.2006, 15:00 Uhr - 18:00 Uhr

### ORT:

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

### PROGRAMM:

15:00 - 16:00 **Dr. Frederik Witt (FU Berlin)**

#### **A supersymmetric approach to special metrics in dimension 8**

Dimension 8 is extremely rich in special metrics, i.e. metrics associated with a  $G$ -structure for  $G$  a proper subgroup of  $SO(8)$ . In this talk, I want to describe a unified approach to  $PSU(3)$ - , - (almost quaternionic Kähler) and  $Spin(7)$ -structures. The latter two appear in Berger's list of Riemannian holonomy groups and are usually defined by a closed self-dual 4-form while  $PSU(3)$  appeared in connection with Hitchin's variational principle and is defined by a closed and co-closed 3-form. In the case of  $Spin(7)$ , it is well-known that this geometry can be rephrased in terms of a unit spinor which is why this group plays a predominant rôle in supersymmetric string compactifications.

On the other hand, this invariant spinor also defines an isometry between vectors and chiral spinors.

I will explain how one can equally characterise  $PSU(3)$ - and -structures by

the existence of such an isometry, giving rise to a spin  $3/2$ -field (also known as Rarita-Schwinger field in supergravity). Moreover, the corresponding differential forms are closed and co-closed if and only if the corresponding spinorial invariant is harmonic with respect to the twisted Dirac operator. In the case of  $Spin(7)$  this is equivalent to

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the holonomy reducing to this group.

16:30 - 17:30 **Dr. Juan Pablo Rossetti**

### **Isospectrality in standard geometries**

After introducing the short necessary background, we will survey some results and problems concerning isospectrality of Riemannian manifolds  $M$  of constant curvature  $K$ .

We will focus on the relation between the Laplace spectrum of  $M$  and the closed geodesics in  $M$ , in the cases  $K=-1$  and  $K=0$ ; and also on the  $p$ -spectrum, i.e., the spectrum of the Laplace-Bertrami operator acting on smooth  $p$ -forms on  $M$ . Many of the examples we will see are in dimensions 2 and 3, then it is possible to draw them.

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