U·H
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CHAMPP
CENTER IN HAMBURG FOR
ASTRO-, MATHEMATICAL AND
PARTICLE PHYSICS

LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

Summer Term 2021

Supersymmetry and Geometry

Jörg Teschner

Course Description:

The goals of these lectures are two-fold: On the one hand we will offer an introduction to basic aspects of supersymmetry that could be useful for students of mathematics and theoretical physicists. The other goal is to introduce geometric structures known under the names of Kähler, hyper-Kähler and special Kähler geometry, and to explain how these geometric structures are related to supersymmetry.

This will be done in three main examples, the relations between
- $N = 1$, $d = 4$ supersymmetry and Kähler geometry,
- $N = 4$, $d = 3$ supersymmetry and hyper-Kähler geometry,
- $N = 2$, $d = 4$ supersymmetry and special Kähler geometry,

respectively. If time permits we will end with an introduction into geometric aspects of Seiberg–Witten theory.

Prerequisites:

We will try to be as self-contained as possible. Some knowledge of basic concepts from differential geometry like the notion of a differentiable manifold and a Riemannian metric will be needed. Other concepts like complex structures will not be required but briefly introduced in the lectures. Apart from this we'll need fairly basic concepts and results from the theory of Lie groups and Lie algebras, and their representations.

Date and Place:	Registration via Stine, access via MIN-Moodle
Starting on:	12 April 2021