

# Aspects of M-theory

Supergravity, duality and noncommutativity

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## Abstract

In this thesis we discuss various aspects of string/M-theory. After an introduction to some aspects of string/M-theory (perturbative string theory, T-duality, S-duality, M-theory, etc.), we discuss supergravity solutions corresponding to bound states of branes and noncommutative theories which are obtained as limits of string/M-theory. So called open brane theories are investigated, especially a six-dimensional non-gravitational theory containing light open membranes, called OM-theory. Decoupling limits for the different theories are derived using open brane data (open brane metric etc.). Moreover, the open membrane metric and generalized noncommutativity parameter are derived using a new method. After the main text there are seven appended research papers. In Paper I renormalization group flows in three and six dimensions are investigated using the AdS/CFT correspondence. Furthermore, in Papers II-VI non-gravitational theories with noncommutativity are investigated using supergravity duals. One result obtained is the notion of deformation independence and how this can be used to obtain open brane metrics and generalized noncommutativity parameters. Duality relations between various theories are also obtained. Finally, in Paper VII we discuss a new solution generating technique, which is used to generate supergravity solutions corresponding to M5-M2 and M5-M2-M2-MW bound states in 11 dimensions.

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