TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Referent: **Dr. Alexander Westphal**
DESY, Theory Group, Hamburg

Thema: **de Sitter Space, Accelerated Expansion and String Theory**

Zeit und Ort: Dienstag, 23.4.2019, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Dominik Stöckinger

Kurzfassung: I will discuss aspects of de Sitter space and inflation models of inflation in the context of string theory. We begin by reviewing four-dimensional dS space. Then we sketch the generic difficulties encountered in string model building and emphasize the particular role played by the KKLT proposal in the recent debate surrounding the "no-dS conjecture". We outline how KKLT passes non-trivial 10D consistency requirements. However, we also explain how simple geometrical consistency constraints indicate a generic difficulty to find SUSY breaking AdS or dS vacua as opposed to run-away solutions only.
The analysis of KKLT in 10D points to a root cause of potential difficulties: backreaction of the stabilized moduli caused either by the direct energetics of the uplift or indirectly via build-up of p-form charge. Looking at the 2nd application of vacuum energy, that of cosmic inflation, the effects of backreaction can be much more pronounced because the relevant energy scales are much closer to the KK and string scale. We will discuss example constructions of large-field inflation in string theory. Here, backreaction of the moduli sometimes lead to strong flattening effects while preserving slow-roll, while it can prevent inflation from taking place in other cases. Finally, (time permitting) I will comment on this flattening dynamics in the context of the swampland conjectures, such as the distance and weak gravity conjecture(s).

Biographie: Alexander Westphal was born 1977 in Rinteln. After his Abitur in Rinteln, he studied physics at Heidelberg U. with a diploma in 2002 (which was awarded the Otto Haxel Prize) and 2005 finished a PhD in physics from Hamburg U. and DESY. His post-docs were at SISSA in Trieste 2005-2007, and at Stanford U. as a Feodor Lynen Fellow from 2007-2010. In 2010-2014 he was a Helmholtz Fellow at DESY. Since 2014, Westphal is a tenured theory staff scientist at DESY, and since 2015 he is the PI of a 5-year ERC Consolidator Grant. In 2015 he was awarded the J. Hans D. Jensen Award.