Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

CLUSTER OF EXCELLENCE
QUANTUM UNIVERSE

QUANTUM UNIVERSE LECTURES

Alexander Westphal (DESY)

"A Hitchhiker's Guide to the Swampland"

15, 29 November, and 6 December 2019 at 14.30h

Seminar Room 2, Building 2a, Campus Bahrenfeld

Abstract:
Recent years have seen the rise of the notion of a so-called `Swampland'. This term appears when discussing the relation between low-energy effective quantum field theories and their possible embedding into candidate theories of quantum gravity such as string theory. In these three lectures we will explain the meaning of this term, the program it defines, and its limitations. Providing such a guide to the swampland for the adventurous hitchhiker trying to reach the realm of quantum gravity may prove useful, as the so-called `swampland conjectures' form the landmarks have varying levels of reliability. Understanding the content and limitations of these conjectures is crucial in order to neither under- nor overrate the relevance of the swampland program in its ability to test in particular string theory.

The first lecture will provide a bottom-up overview of the subject. The last two lectures will look a bit more closely at the 4 conjectures which may at this time provide the most representative cross-section concerning the interplay of rigorous evidence for a given conjecture versus its phenomenological relevance: The `no-global-symmetries' conjecture, the `weak gravity conjecture (WGC)', the `swampland distance conjecture (SDC)', and the `swampland de Sitter conjecture(s) (SdSC)'.