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JOHANNES GUTENBERG
UNIVERSITÄT MAINZ



RIND seminar on Mathematical Physics and String Theory

Dec. 19, 2022 at 4 p.m. c.t.
LMU Munich (Room A348)

Joint seminar series on Mathematical Physics and String Theory

Niccolo Cribiori & Ralph Blumenhagen
Max Planck Institut for Physics, Munich

Cobordism, K-theory and tadpoles

The absence of global symmetries is widely believed to be a principle of quantum gravity. Recently, it has been generalised to the statement that the cobordism group of quantum gravity must be trivial. Indeed, a non-trivial group detects a higher-form global symmetry, which has then to either be gauged or broken. In the case in which it is broken, defects have to be introduced into the setup. These can be end-of-the-world branes furnishing a dynamical realization of cobordism, of which we will provide a new concrete example. In the case in which the symmetry is gauged, we will argue that there is a non-trivial interplay between cobordism and K-theory, leading to the construction of type IIB/F-theory tadpoles from a bottom-up perspective. This interpretation of cobordism and K-theory as charges in quantum gravity can be given further support when passing from groups of the point to groups of a generic manifold X . We will argue that these more general groups have a natural interpretation in terms of the dimensional reduction of the theory on X . A systematic analysis can possibly lead to the prediction of new contributions to string theory tadpoles.

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