

This thesis deals with de Sitter space as an alternative to Minkowski space, which is generally used in theories describing matter and fields (for example quantum field theory). The problem of mass in de Sitter space is analyzed in more detail. The mathematical apparatus needed in this thesis, from factor groups, through Lie groups and algebras to Casimir operators, is also mentioned. In the final part it is shown, that de Sitter space is a factorgroup $dS(1, 3) = \frac{SO(1,4)}{SO(1,3)}$, which is at least from mathematical standpoint much more natural factorization than $\frac{Poincaré}{SO(1,3)}$, which leads to Minkowski. Conformal cyclic cosmology developed by Roger Penrose is briefly described as a motivation for this thesis. This theory could benefit from some properties of de Sitter relativity.