

# Fundamental physics in the cosmos: The early, the large and the dark Universe



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## Axions, global symmetries and gravity.

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It is commonly believed that no global symmetries can exist in a consistent theory of quantum gravity. This “folk argument” can be put on more solid and quantitative ground by explicitly constructing non-perturbative gravitational instanton solutions. In this talk, I will review such solutions in the case of an axion field minimally coupled to Einstein gravity. I will discuss both theoretical and phenomenological implications, with a special focus on the case of the QCD axion.

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