

## Axion couplings

*Tuesday, 11 April 2023 11:00 (22 minutes)*

In this talk, recent advances in the theoretical description of axions and their interactions are presented. We start by recalling the principle of reparametrization invariance, based on the Goldstone boson nature of the axion. Using this principle as a tool, we discuss first the axion coupling to gauge bosons, and show that they are actually not driven by the anomalies. Then we describe the entanglement of the axion PQ symmetry with baryon and lepton numbers, and how this can be used phenomenologically for example to explain the neutron lifetime puzzle. Finally, we study how dark matter axions interact with SM fermions, and show that a direct EDM-like coupling for all charged fermions has been missed up to now. Being a prediction of the Dirac theory analogous to the  $g=2$  magnetic moments, these EDMs would be rather large, possibly to the point of making the electron, neutron or atom EDMs our best probes for relic QCD axions over large swaths of parameter space.

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