

What can solve the Strong CP Problem?

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While the axion is the most popular solution to the strong CP problem, it is sometimes claimed that the strong CP problem can be solved by imposing parity or CP as a symmetry of the theory or perhaps to ignore the strong CP problem completely by fine tuning the theta angle. For these solutions to work, the theta angle has to be a parameter of the theory. I will argue that this is incorrect - the theta angle of QCD arises as a choice of quantum state and it is thus not a parameter that can either be set to zero by imposing a symmetry or fine-tuning. This shows that the strong CP problem can only be solved by dynamical mechanisms such as the axion, strongly motivating experimental searches for it. The lecture will be pedagogical and I will make these points using simple examples rather than complicated formalism.

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