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Heavy Axion Solution of the Strong CP Problem

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I discuss a new axionic solution to the strong CP problem which involves a hypothetical vector-like quark(s) in a high-colour representation of the conventional QCD. There are two distinct scenarios. If the current mass of the exotic quark is zero, the strong CP phase can be trivially rotated away. The high-colour quark is 'hidden' in various bounds states, the lightest being the composite axion field, with properties similar to the standard invisible axion. If the high-colour quark acquire a non-zero current mass due to the spontaneous chiral symmetry breaking, the composite axion can be heavy, while the strong CP phase is still cancelling out in the vacuum. I also speculate that this heavy axion can be the 750 GeV diphoton resonance apparently seen in the early LHC Run 2 data.

Summary

Primary author: Dr KOBAKHIDZE, Archil (The University of Sydney)

Presenter: Dr KOBAKHIDZE, Archil (The University of Sydney)

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