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Searching for QCD Instantons at hadron colliders

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The existence of topological solutions of the Standard Model field equations has been established since the 70ies. In Quantum Chromodynamics, these “Instanton transitions” are known to play a fundamental role in the long-distance behaviour of the theory, yet direct experimental evidence of these phenomena is still lacking. This raises the question of whether these processes could be observed at current or future high-energy colliders. In this contribution the signatures of Instanton induced processes at hadron colliders will be discussed, and different search strategies aiming to disentangle the contribution of QCD Instantons from the large background from other QCD processes will be presented. First upper limits on the Instanton production cross-section have been derived from published LHC data, as well as the expected sensitivities from future targeted searches at the LHC and HL-LHC.

Preferred track

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