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Instantons processes at colliders

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QCD instantons are arguably the best motivated yet unobserved nonperturbative effects predicted by the Standard Model. A discovery and detailed study of instanton-generated processes at colliders would provide a new window into the phenomenological exploration of QCD and a vastly improved fundamental understanding of its non-perturbative dynamics. We review a recent calculation of QCD instanton-induced processes in proton-proton collisions accounting for quantum corrections due to both initial and final state gluon interactions. Although QCD instanton processes are predicted to be produced with a large scattering cross-section at small centre-of-mass partonic energies, discovering them at hadron colliders is a challenging task that requires dedicated search strategies.

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