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Hunting for QCD Instantons at the LHC in the forward proton mode

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We discuss the current status of the ongoing project on
searches for the QCD instantons at hadron colliders
in events with large rapidity gaps. These gaps in rapidity
are formed by either Pomeron or photon exchanges or a combination
of the two. We computed for the first time the relevant
differential cross-sections for a complete set of instanton production
in single diffraction and CEP
processes at the LHC, including gluon-induced and quark-induced
amplitudes, and also show that the largest contribution to CEP comes
from processes with Pomeron exchanges where a single gluon from each
Pomeron couples to the instanton.
A strategy of how to search for QCD instantons of invariant
mass 20 - 60 GeV in diffractive events at the
LHC is outlined. By imposing appropriate cuts on final states in SD, it is expected that we can select the kinematical region where the Instanton
signal exceeds the SM background by at least 2.5.
The rate is expected
to be large enough to measure Instanton production at the LHC
in the events with a single tag at low Luminosity.
The work is still very much in progress.

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