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Exploring dark Z_d -boson at LHC

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Hidden sectors or dark sectors are hypothetical components appearing in various extensions to the Standard Model (SM), introduced to address phenomena not addressed by the SM (e.g the existence of dark matter or positron excess in the cosmic microwave background radiation flux). To incorporate the hidden sector, the introduction of an additional $U(1)_d$ dark gauge symmetry is necessary. This implies the presence of an extra gauge boson, often referred to as a dark photon or dark gauge boson Z_d^μ . The dark photon could interact with both the hidden sector particles and the SM particles through a kinetic mixing term. The coupling between the dark photon and the SM can be explored at the Large Hadron Collider (LHC) through proton-proton collisions. We probe various possible channels in the LHC environment and study the constraint on coupling(s) versus m_{Z_d} at the centre of mass energy $\sqrt{s} = 13.6$ TeV with expected luminosity.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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