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Z' Signature from Muon Pair Production at LHC

We search for signatures of the extra neutral gauge boson Z' , predicted in some extensions of the Standard Model, from the analysis of some distributions for $p + p \rightarrow \mu^+ + \mu^- + X$, where the only exotic particle involved is Z' . In addition to the invariant mass and charge asymmetry distributions, we propose in our search to use the transverse momentum distribution (p_T) as an observable. We do our calculation for two values of the LHC center of mass energy (7 and 14 TeV), corresponding to 1 and 100 fb⁻¹ of luminosity, in order to compare our findings from some models with the distributions following from the Standard Model. By applying convenient cuts in the invariant mass, we show that the final particles p_T distributions can reveal the presence of an extra neutral gauge boson contribution. We also claim that it is possible to disentangle the models considered here and we emphasize that the minimal version of the model, based on $SU(3)_C \times SU(3)_L \times U(1)_X$ symmetry, presents the more clear signatures for Z' existence.

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