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Exclusion bounds for neutral gauge bosons

Wednesday 13 March 2024 14:00 (30 minutes)

We study how the recent experimental results constrain the gauge sectors of $U(1)$ extensions of the standard model using a novel representation of the parameter space.
We determine the bounds on the mixing angle between the massive gauge bosons, or equivalently, the new gauge coupling as a function of the mass $M_{Z'}$ of the new neutral gauge boson Z' in the approximate range $(10^{-2}, 10^{4})$ GeV/c^2.
We consider the most stringent bounds obtained from direct searches for the Z'. We also exhibit the allowed parameter space by comparing the predicted and measured values of the ρ parameter and those of the mass of the W boson.
Finally, we discuss the prospects of Z' searches at future colliders.
This work is presently submitted for publication, the corresponding preprint can be found at arXiv:2402.14786.

Author: PÉLI, Zoltán (Institute for Theoretical Physics, ELTE Eötvös Loránd University)

Co-author: TROCSANYI, Zoltan Laszlo (ELTE Eotvos Lorand University (HU))

Presenter: PÉLI, Zoltán (Institute for Theoretical Physics, ELTE Eötvös Loránd University)

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