MODEL INDEPENDENT SEARCH FOR Z' AT HADRON COLLIDERS

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Searching for the Z' gauge boson [1] is a hot topic nowadays. Model dependent search for this particle was already carried out at LEP, and the low bounds were found to be $m_{Z'} \geq 400 - 2000$ GeV, dependently on a particular model. This kind of searches is caring out for the Tevatron and LHC data. Recent bounds have been reported: $m_{Z'} \geq 1.5 - 2$ TeV.

The $m_{Z'}$ interval for the models is large, and so additional model independent searches are also desirable. In the letter approach, not only the mass $m_{Z'}$ but also the couplings to fermions are arbitrary parameters. The key observation here is that the specific correlations between couplings take place. The most important is the fact that the axial-vector coupling a_f^2 of the Z' to the fermions is an universal parameter independently of the leptons and quarks and the type of them. So, just this parameter is a pronounced signal of the virtual (or even real) particle. On the base of these relations, the results of the LEP experiments have been analyzed, and the hints at $\sim 1.5 - 2\sigma$ C.L. obtained (see review paper [2]).

As a next step, we construct the observable which uniquely picks out the signals of the virtual (as well as real) Z' boson for both the Tevatron and LHC set up of experiments. This variable has to account for the specific role of the a_f^2 coupling of the Z' to fermions and suppress signal of other possible virtual states. It is constructed on the base of the well known process: $\bar{q}q \to \mu^+\mu^-(e^+e^-)$, with PDF taken into consideration. Then, the results of the current experiments can be analyzed and compared with the ones of the model dependent searches.

References

[1] A. Leike, Phys. Rep. **317, 143(1999).**

[2] **A. V. Gulov and V.V. Skalozub, e-print arXiv:0905.2596v2[hep-ph]; Int.J.Mod.Phys. A 25, 5787 (2010).**