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Walking Technicolor in light of Z' searches at the LHC

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In the post-Higgs era of particle physics there remain many open questions requiring physics Beyond the Standard Model. Minimal Walking Technicolor (WTC) theory provides an alternative to the SM Higgs mechanism of mass generation, where a new strong force with ‘walking’ (slowly running) coupling breaks electroweak symmetry dynamically. This resolves the hierarchy problem as well as providing a composite Higgs boson that is consistent with observation. The phenomenology of WTC includes two triplets of heavy vector bosons (Z', Z''). We interpret the limits from Run 2 LHC data on neutral Drell-Yan processes in the WTC parameter space, where the Z' and Z'' provide complementary exclusions on WTC. We also evaluate the potential of the LHC to probe the WTC parameter space at future upgraded energy and higher luminosities.

Summary

We explore the phenomenology of Walking Technicolor (WTC) theory, and establish the most up-to-date limits on WTC from Run 2 LHC data on Z' resonances in the dilepton channel. We provide predictions for the future of WTC within the lifetime of the (HL)LHC.

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