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Electroweak precision test of axion-like particles

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We study the contributions of an axion-like particle to the electroweak precision observables. The particle is assumed to couple with the standard model electroweak gauge bosons. It is found that the effects arise not only via the oblique S and U parameters but also via radiative corrections to the gauge couplings. Besides, the decay of $Z \to a\gamma$ affects the total width of the Z boson. All of those contributions are considered simultaneously in the global fit analysis of the electroweak precision observables. Also, we discuss the recent CDF result of the W-boson mass measurement. It is found that the discrepancy from the standard model prediction is solved if the axion-like particle is heavier than 500 GeV and its coupling to the di-photon is suppressed.

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