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Exploring Background Contributions in $H \rightarrow Z\gamma$ Decay

The rare decay process $H \rightarrow Z\gamma$ has been investigated by both the ATLAS and CMS collaborations, with both reporting an event excess characterized by $\mu = 2.2 \pm 0.7$. This anomaly was initially attributed to potential modifications of the $HZ\gamma$ vertex. However, since the $H \rightarrow Z\gamma$ signal is reconstructed via the $H \rightarrow \ell\ell\gamma$ channel, background effects-particularly those from processes mimicking the final state-may have been underestimated. In this work, we re-examine these background contributions in detail and propose that the observed excess can be explained by an additional BSM - induced background. We present both an effective field theory framework and a UV-complete model that account for the necessary contributions and offer a consistent interpretation of the observed data.

Secondary track

T09 - Beyond the Standard Model

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