

The impact of dark Higgs mechanism on the detection of invisible dark photon

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In the phenomenology study of dark photon, its mass origin is usually not under concern. However, in theory construction its mass is often generated via a dark Higgs mechanism, which leads to the presence of a light (non-decoupled) dark Higgs particle. We study the impact of such a dark Higgs particle in the collider detection of the dark photon. We focus on the process of final state dark photon radiating dark Higgs, which is called dark final state radiation (FSR). In particular, we perform “merging” to obtain physical distribution of dark FSR. Invisible dark photon search at BaBar is reanalyzed by considering the effect of dark FSR, and a new exclusion limit for invisible dark photon is presented.

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