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Dark Higgs Channel for FERMI GeV γ -ray Excess

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Dark Higgs is very generic in dark matter models where DM is stabilized by some spontaneously broken dark gauge symmetries. Motivated by the FERMI observation of \sim GeV scale γ -ray excess from the galactic center (GC), we investigate a scenario that a pair of dark matter X annihilates into a pair of dark Higgs H₂, which subsequently decays into standard model particles through its mixing with SM Higgs boson. Besides the two-body decay of H₂, we also include multibody decay channels of the dark Higgs. We find that the best-fit point is around $M_X \approx 95.0$ GeV, $M_{H_2} \approx 86.7$ GeV, $\langle \sigma v \rangle \approx 4.0 \times 10^{-26}$ cm³/s and gives a p-value ≈ 0.40 . Implication of this result is described in the context of dark matter models with dark gauge symmetries. Since such a dark Higgs boson is very difficult to produce at colliders, indirect DM detections of cosmic γ -rays could be an important probe of dark sectors, complementary to collider searches.

Primary author: KO, pyungwon (Korea Inst. for Advanced Study (KIAS))

Co-author: Dr TANG, Yong (KIAS)

Presenter: KO, pyungwon (Korea Inst. for Advanced Study (KIAS))

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