

# Dark Hadrons at Lifetime Frontier Experiments

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Dark hadrons are hypothetical particles which reside in the dark sector and originate from the confining gauge dynamics in the dark sector. These particles are proposed in several dark sector models, such as composite asymmetric dark matter models and strongly interacting massive particle models. The dark sector is feebly connected to our sector through dark photons which kinematically mix with our photons. While alleviating cosmological problems, dark photons make dark hadrons long-lived in terrestrial experiments. Moreover, the dark hadrons are produced through the very same dark photon. In this study, we discuss the visible decay searches for dark hadrons. For a few GeV dark hadrons, the LHC lifetime frontier, MATHUSLA and FASER, has a potential to discover their decay when kinetic mixing angle of dark photon is  $\epsilon > 10^{-4}$ . On the other hand, fixed-target experiments, in particular DarkQuest, will have a great sensitivity to dark hadrons with a mass below GeV and with kinetic mixing  $\epsilon > 10^{-4}$  in addition to the LHC lifetime frontier. These projected sensitivities to dark hadrons in dark photon parameter space are comparable with the future sensitivities of dark photon searches, such as Belle-II and LHCb.

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