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# Takumi Kuwahara "Dark Hadrons at LHC lifetime frontier"

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The LHC lifetime frontier will probe a dark sector in the near future, and the visible decay searches at fixed-target experiments have been exploring the dark sector. Dark strong dynamics provides rich structure in the dark sector: dark baryons and dark mesons. Dark photons are also introduced to alleviate cosmological problems. Meanwhile, 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 composite asymmetric dark matter and dark pion dark matter. The LHC lifetime frontier (MATHUSLA, FASER, and FACET) has a potential to discover the transition and decay of dark hadrons for a specific spectrum. For composite asymmetric dark matter models, the visible signals arise from dark nucleon transition and dark pion decay. 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. Meanwhile, for the dark pion dark matter model, the visible signals arise from dark vector-meson decay. Depending on the mass spectrum, these sensitivities are comparable with the dark photon searches such as DarkQuest, Belle-II, LHCb, and HPS.

**Session Classification:** Short talks