

New collider searches for dark photon

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The dark photon is a well-motivated new particle, arising from a renormalizable interaction with the photon field. This so-called vector portal can lead to a dark sector, which can contain candidates for dark matter. In this talk, I discuss searches for dark photons at photon-electron colliders, with applications to LUXE and a future Gamma Factory, and electron-positron colliders, with a focus on Belle II. We found that photon beam dump offers a novel search strategy for dark photons, while bump hunting can be a viable strategy at a Gamma Factory. We have studied displaced vertices from dark photon decays at Belle II and modeled the background for such a signal. Belle II has excellent sensitivity to such dark photon signals and can probe them in an unexplored region of the parameter space using already collected data.

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