



Contribution ID: 195

Type: PhD forum talk + poster

Searches for Dark Photons at Belle II

Wednesday, June 2, 2021 3:36 PM (6 minutes)

Belle II is a B-Factory experiment designed to produce precision measurements of CP violation in the weak sector as well as search for Beyond the Standard Model particle physics. The e^+e^- collisions are created by the SuperKEKB accelerator which has achieved a world record of instantaneous luminosity of $2.4 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$. One of the highest priorities for the early data of the experiment is the search for dark photons that decay to dark matter. A dark photon is a mediator within the dark sector which mixes with the Standard Model (SM) photon. The experimental signature is a single energetic photon observed in the detector. A dark photon would produce an excess of events in the single photon recoil mass. A particularly challenging case is when the visible photon carries the full beam energy, which corresponds to a low-mass dark photon. There is a significant background from the SM process $e^+e^- \rightarrow \gamma\gamma$, where one of the photons is missed due to detector imperfections. This has motivated us to study the structure of the sub-detectors and compare the data and Monte Carlo response. By understanding the photon detection sensitivity of the sub-detectors, we will estimate the background for dark photon studies. This talk will discuss the “single photon search” and the approach to quantifying this background.

arXiv number (if applicable)

Primary author: WAKAI, Miho (University of British Columbia)

Presenter: WAKAI, Miho (University of British Columbia)

Session Classification: PhD Forum