

Abstract Submitted  
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**Long-Lived Particles at B Factories**<sup>1</sup> ALBANY BLACKBURN, MAVIS STONE, MASON ACEVEDO, Harvey Mudd College, NIKITA BLINOV, Fermilab, BRIAN SHUVE, Harvey Mudd College — We investigate the sensitivity of searches for displaced vertices from decays of long-lived particles (LLPs) at Belle II. By using effective field theory methods, we derive the possible decay modes of the LLP, finding that LLPs can generically decay to more than two charged particles. This enables us to investigate searches for displaced vertices with at least two tracks and/or multiple displaced vertices in the event. To demonstrate the broad applicability of this approach, we study the sensitivity of several LLP pair-production mechanisms, including dark photons and dark Higgs bosons. Exploring dark photon masses from 4 - 7 GeV and dark Higgs boson masses from approximately 2 - 4 GeV, we find that Belle II could detect dark photon kinetic mixings as small as  $10^{-6}$  and B meson branching fractions as small as  $10^{-8}$ . This work is complementary to experiments at the LHC due to the low masses and momenta of the particles involved and illustrates that a search for multi-track displaced vertices at Belle II offers sensitivity to broad classes of hidden sector LLPs.

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