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Dark Photon Search at BESIII using Initial State Radiation

Saturday, 27 June 2026 15:00 (2 hours)

One of the greatest unsolved mysteries of modern physics is the observation of invisible yet gravitationally attractive dark matter. The dark photon A' is a proposed new U(1) gauge boson that offers a unique vector portal between the Standard Model and the dark sector.
This poster presents a new, ongoing search at BESIII for the creation and visible decay of a massive dark photon via the initial state radiation process $e^+e^- \to A'\gamma_{ISR} \to l^+l^-\gamma_{ISR}, (l = e, \mu)$. This analysis uses the newly acquired BESIII data on the $\psi(3770)$ resonance with a luminosity of $(20.275 \pm 0.077)\,\mathrm{fb}^{-1}$, currently the world's largest data set at $\sqrt{s} = 3.773\,\mathrm{GeV}$. The final state l^+l^- invariant mass spectra are scanned to search for a narrow dark photon resonance atop the irreducible QED background.

Collaboration

BESIII

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