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Searching for Dark Photons at Sirius

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The Sirius synchrotron facility at the Brazilian Synchrotron Light Laboratory is a state-of-the-art fourth-generation storage ring capable of providing high-intensity 3 GeV electron beams. In this talk, we propose leveraging this advanced infrastructure to drive high-luminosity electron-photon collisions by impinging a 1 eV monochromatic laser directly onto the accelerated beam. This unique collision geometry provides an ideal terrestrial platform to search for the dark photon (A'), a well-motivated gauge boson that acts as a kinetic-mixing portal between the Standard Model and an invisible dark sector. By exploiting the Dark Inverse Compton Scattering process, $\gamma e^- \rightarrow A' e^-$, we can isolate this mediator through missing-energy signatures in the recoil electron spectrum and statistical deficits in the standard Compton photon flux. We will present our projected sensitivity demonstrating that, with one year of data acquisition, this setup can significantly reduce standard backgrounds to probe previously unexplored parameter space, placing competitive 95% C.L. upper bounds on the kinetic mixing parameter ($10^{-8} \leq \epsilon \leq 10^{-6}$) for dark photon masses up to 10 keV. Reference: 2603.00247

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