

Theory of Elementary Particles, Astroparticle Physics, and Phenomenology (TEPAPP) Seminar

Wednesday, October 27th @ 9:00AM

Held virtually

“Dark Photon Limits: A Cookbook” Alexander Millar (Stockholm University)

Abstract: The dark photon is a massive hypothetical particle that interacts with the Standard Model by kinetically mixing with the visible photon. Due to the similarities with the electromagnetics signals generated by axions, several bounds on dark photon signals are simply reinterpretations of historical bounds set by axion haloscopes. However, the dark photon has a property that the axion does not: an intrinsic polarization. We show that if one does account for the DP polarization, and the rotation of the Earth, an experiment's discovery reach can be enhanced by over an order of magnitude. We detail the strategies that would need to be taken to properly optimize a dark photon search. We also point out that several well-known searches for axions employ techniques for testing signals that preclude their ability to set exclusions limits on dark photons.