

# **Observational tests for Beyond Standard Model Physics: CMB Photon oscillation into Hidden Sector and Axion like Particles.**

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We seek to study how the observed spectrum of cosmological photons is modified if a theory that considers new particles is incorporated, analogues to the usual photons, called Hidden Photons and axion-like particles.

To study these possible modifications, we introduce a model that contains parameters that correspond to the masses and couplings for both new particles. These being free parameters, we seek to find the best adjustment of the spectrum observed with the modifications to the usual black body spectrum and thus obtain regions of exclusion, in which we can observe the possible validity of the extended theory.

Then we need to improve these regions of exclusion, incorporating new interactions in the process of photon oscillation to Hidden Photon and axions, in addition to improving our understanding of the cosmological processes occurring in the evolution of the universe, such as recombination and reionization. [1-2]

As an experimental test, the model is studied from a point of view where the oscillation between particles occurs in an empty environment.

These experiments are of the Aharonov-Bohm type where they study the existence of electric and magnetic fields in the different regions of space, where it can be inferred if there is a presence of new particles. [3]

## **arXiv**

<https://arxiv.org/abs/0901.0014> ; <https://arxiv.org/abs/0905.4865> ; <https://arxiv.org/abs/1710.08740>

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