

Further Inspections of an Electrodynamics in Presence of Axion and Dark Photon

M. Reetz^a, J. P. S. Melo^a e B. T. Menezes^a

a) Centro Brasileiro de Pesquisas Físicas

Resumo

In this contribution, we first explore an extended electrodynamics (ED) in the presence of the axion and the dark photon. The model presents a kinetic mixing between two Abelian gauge groups, one $U(1)_{\text{EM}}$ responsible by the usual ED and another $U(1)_{\text{Dark}}$ responsible by the ED in dark photon sector. This mixing is carried out by portals of the kind $(a\gamma\gamma)$, $(a\gamma\gamma')$ and $(a\gamma'\gamma')$, that is, portals mediated by the presence of axion-photon-photon, axion-photon-dark photon and axion-dark photon-dark photon couplings terms, respectively. In the model both massive and non-massive dark photons are contemplated. In a second moment, we turn our focus to obtaining new results, among which, the symmetrical energy-momentum tensor of the model. This is composed by the modified Poyinting vector, the modified energy density and the modified Maxwell stress tensor. As a step further, we linearized the model in the presence of a background constant magnetic field and then we extract the dispersion relation. Finally, we demonstrate the Primakoff Effect in presence of this external magnetic field.