



Contribution ID: 165

Type: **Invited talk in a parallel session**

Extended Theories of Electro-Magnetism for astrophysics and cosmology

Monday, 8 July 2024 15:00 (30 minutes)

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The ad-hoc dark Universe compatible to GR, faces the lack of experimental evidence and of identified candidate particles in the SM. Meanwhile, going beyond GR is also not observationally supported. Since photons remain the main messengers of the cosmos, we analyse whether Generalised Theories of Electro-Magnetism induce a reinterpretation impacting cosmology. The SME induces a mass to a photon [1,2], the only SM free massless particle, compatible to the upper limits by FRBs [3-5] and solar wind [6,7]. The photons either SME or massive of the de Broglie-Proca type or non-linear of the Born-Infeld, Heisenberg-Euler type and even Maxwellian undergo a frequency shift in presence of EM and/or LSV backgrounds [8]. This shift, added to expansion redshift determines new cosmological scenarios, e.g., without recurring to the accelerated expansion [9-11] and possibly dark matter. Finally, we have applied the Heisenberg principle to cosmological scales, reading the Hubble-Humason-Lemaître constant as quantum measurement and reinterpreting the tension accordingly [12,13].

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Session Classification: Extended theories of electromagnetism and their impact on laboratory experiments and astrophysical observations

Track Classification: Theory and Experiments in Fundamental Physics: Extended theories of electro-

magnetism and their impact on laboratory experiments and astrophysical observations