



Contribution ID: 446

Type: **Talk**

Ultralight scalars in leptonic observables (17+3)

Sunday 5 September 2021 16:30 (20 minutes)

Many new physics scenarios contain ultralight scalars, states which are either exactly massless or much lighter than any other massive particle in the model. Axions and majorons constitute well-motivated examples of this type of particle. In this work, we explore the phenomenology of these states in low-energy leptonic observables. After adopting a model independent approach that includes both scalar and pseudoscalar interactions, we briefly discuss the current limits on the diagonal couplings to charged leptons and consider processes in which the ultralight scalar ϕ is directly produced, such as $\mu \rightarrow e\phi$, or acts as a mediator, as in $\tau \rightarrow \mu\mu\mu$. Contributions to the charged leptons magnetic and electric moments are studied as well.

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Session Classification: Flavour physics - CKM and beyond

Track Classification: Flavour physics - CKM and beyond