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LFU and CP violation

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The persistent hints of LFU violation in $b \rightarrow s\ell\ell$ may imply an existence of leptoquarks close to the TeV scale that couple to $b\mu$ and $s\mu$. These leptoquark Yukawa couplings can in full generality be complex and thus provide a new source of CP violation. We show that a large CP phase with a definite sign is perfectly viable for an S_3 leptoquark of mass below a few TeV, consistent with CP even and CP odd $b \rightarrow s\ell\ell$ and B_s mixing observables. Furthermore, we show how the direct CP asymmetries in $B \rightarrow K\mu\mu$ are significantly enhanced in the vicinity of narrow charmonia, and that their measurement in the future could provide important additional information in constraining the potentially CP violating NP in $b \rightarrow s\ell\ell$. Possibilities for constraining such CP phases at the LHC and future colliders will also be presented.

In-person participation

Yes

Primary author: SMOLKOVIC, Aleks (University of Bern)**Presenter:** SMOLKOVIC, Aleks (University of Bern)**Session Classification:** Quark and Lepton Flavour Physics**Track Classification:** Quark and Lepton Flavour Physics