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Probing SUSY effects in $K^0_S \rightarrow \mu^+ \mu^-$

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We explore supersymmetric contributions to the decay $K^0_S \rightarrow \mu^+ \mu^-$, in light of current experimental data. The Standard Model (SM) predicts $B(K^0_S \rightarrow \mu^+ \mu^-) \approx 5 \times 10^{-12}$. We find that contributions arising from flavour violating Higgs penguins can enhance the branching fraction up to $\approx 35 \times 10^{-12}$ within different scenarios of the Minimal Supersymmetric Standard Model (MSSM), as well as suppress it down to $\approx 0.78 \times 10^{-12}$. Regions with fine-tuned parameters can bring the branching fraction up to the current experimental upper bound, 8×10^{-10} . The mass degeneracy of the heavy Higgs bosons in MSSM induces correlations between $B(K^0_S \rightarrow \mu^+ \mu^-)$ and $B(K^0_L \rightarrow \mu^+ \mu^-)$. Predictions for the CP asymmetry in $K^0 \rightarrow \mu^+ \mu^-$ decays in the context of MSSM are also given, and can be up to eight times bigger than in the SM. The study is accepted for publication in JHEP

Primary authors: LUCIO MARTINEZ, Miriam (Universidade de Santiago de Compostela (ES)); MARTINEZ SANTOS, Diego (Universidade de Santiago de Compostela (ES)); CHOBANOVA, Veronika Georgieva (Universidade de Santiago de Compostela (ES)); Dr KITAHARA, Teppei (Karlsruhe Institute of Technology); D'AMBROSIO, Giancarlo; YAMAMOTO, Kei

Presenter: LUCIO MARTINEZ, Miriam (Universidade de Santiago de Compostela (ES))

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