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New physics in $b \to s\ell\ell$ decays with complex Wilson coefficients.

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We perform a data-driven analysis of new physics (NP) effects in exclusive $b \to s\ell^+\ell^-$ decays in a model-independent effective theory approach with dimension six operators considering scalar, pseudo-scalar, vector and axial-vector operators with the corresponding Wilson coefficients (WC) taken to be complex. The analysis has been done with the most recent data while comparing the outcome with that from the relatively old dataset. We find that a left-handed quark current with vector muon coupling (O_9) is the only one-operator scenario that can explain the data in both the cases with real and complex WC with a non-zero imaginary contribution. This is the case even if all the CP-asymmetric observables are dropped from the fit. We have pointed out the corresponding CP-averaged and CP-asymmetric observables which could be the
probable source of such large imaginary contributions. We simultaneously apply model selection tools like cross-validation and information theoretic approach like Akaike Information Criterion (AIC$_c$) to find out the operator or sets of operators that
can best explain the available data in this channel. It is observed that O_9 with complex WC is the only one-operator scenario which survives the test. However, there are a few two and three-operator scenarios (with real or complex WCs) which survive the test, and the operator O_9 is common among them. For the selected scenarios, we have
provided predictions for various observables and compared them.

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