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Recent searches for beyond-SM effects in B-meson decays at BaBar

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In the recent past, several hints of inconsistencies between experimental results and theory predictions in the framework of the Standard Model (SM) have been obtained from measurement of B-meson decays, though no beyond-SM (BSM) effects have been observed yet.
We report here about a few recent searches for BSM effects in B-meson decays performed with the full BaBar data sample, collected at the energy of the Υ(4S) resonance, which corresponds to 471 million $B\bar{B}$ pairs.
Among these, measurements of semileptonic decays involving the tau lepton that evidenced a significant discrepancy with the SM predictions, and of the rare flavour changing neutral current processes $B \to K^{(*)}l^+l^-$ where $l = e, \mu, \tau$. The latter, highly suppressed in the SM, occur at lowest order via 1-loop diagrams, and contributions from virtual particles in the loop allow one to probe large mass scales at relatively low energies. In particular, the decays $B \to K^*e^+e^-$ and $B \to K^*\mu^+\mu^-$ (both charged and neutral modes) are studied using an angular analysis to extract the quantities A_{FB} and F_L, and the quantity P_2, which is subject to smaller theoretical uncertainties and is more sensitive to non-SM contributions. We also present a search for the not yet observed $B^+ \to K^+\tau^+\tau^-$ decay.

Experimental Collaboration

BABAR

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