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Symmetries and Asymmetries of B -> K* mu+ mu- Decays in the Standard Model and Beyond

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The rare decay B -> K*(-> K pi) mu+ mu- is regarded as one of the crucial channels for B physics as the polarization of the K* allows a precise angular reconstruction resulting in many observables that offer new important tests of the Standard Model and its extensions. These angular observables can be expressed in terms of CP-conserving and CP-violating quantities which we study in terms of the full form factors calculated from QCD sum rules on the light-cone, including QCD factorization corrections. We investigate all observables in the context of the Standard Model and various New Physics models, in particular the Littlest Higgs model with T-parity and various MSSM scenarios, identifying those observables with small to moderate dependence on hadronic quantities and large impact of New Physics. One important result of our studies is that new CP-violating phases will produce clean signals in CP-violating asymmetries. We also identify a number of correlations between various observables which will allow a clear distinction between different New Physics scenarios.

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