

## Journées de Rencontre Jeunes Chercheurs 2023



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### B-anomalies

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Deviations from the Standard Model have long been observed in semileptonic B-meson decays, notably  $b \rightarrow sll$  transitions, triggering speculations on potential New Physics effects in this sector. After the recent update of  $RK^{(*)}$  and  $BR(B(s) \rightarrow \mu\mu)$  by the LHCb collaboration, the remaining significant deviations from the SM in FCNC B decays are found in the branching ratios of mesonic decays involving  $b \rightarrow s\mu\mu$  and in the angular observable  $P'5$ .

Unlike  $RK^{(*)}$  and  $BR(B(s) \rightarrow \mu\mu)$ , the observables  $BR(B(s) \rightarrow M\mu\mu)$  ( $M = K(), \phi, \dots$ ) are theoretically challenging to predict accurately because of their high sensitivity to non-perturbative QCD contributions, both local and non-local. These contributions yield a theoretical error of order 30%, which can be as large as (sometimes larger than) the experimental uncertainty, and clearly hamper the potential of these observables for discovery.

I will discuss the current state of B-meson anomalies, and the impact of transition form factors when considering the tension of experimental data with respect to the Standard Model.

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