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Search for New Physics with Rare Heavy Flavour Decays at LHCb

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The LHCb experiment has the potential, during the 2010-11 run, to observe, or improve significantly the exclusion bounds on, the rare decays $B_s \rightarrow \mu^+ \mu^-$ and $D^0 \rightarrow \mu^+ \mu^-$. These studies will provide very sensitive probes of New Physics effects. High sensitivity to New Physics contributions is also achieved by searching for direct CP violation in $B^0 \rightarrow K \gamma$, *performing a time dependent analysis of $B_s \rightarrow \phi \gamma$, and making an angular study of the decay $B^0 \rightarrow K \mu^+ \mu^-$* . Here also significant results are expected from the present run. Preparations for these analyses will be presented, and studies shown of how existing data, for example prompt J/psi events, can be used to validate the analysis strategy.

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