

DISCRETE '08: Symposium on Prospects in the Physics of Discrete Symmetries



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Rare Decays at LHCb

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The LHCb experiment will already in 2009 obtain more B-meson decays than has been recorded by any other experiment previously. This provides a unique opportunity for studying very rare decays where the effects of physics beyond the Standard Model might be dominating. The decay $B_s \rightarrow \mu^+ \mu^-$ is very sensitive to an extended Higgs sector and might be the first place to see the effects of new physics in data from LHC. We will discuss the details of the planned analysis and show that an upper limit for the branching ratio can be set right down to the SM prediction with the data expected in 2009. The decays $B_s \rightarrow \phi \gamma$ and $B_d \rightarrow K^0 \mu^+ \mu^-$ are flavour changing neutral current decays that cannot happen at the tree level. Through the virtual particles in the box and penguin diagrams responsible for the decays, they are sensitive to new particles well into the TeV mass range. The first results on $B \rightarrow K^0 l^+ l^-$ decays from the e⁺e⁻ B factories provide some tantalising hints for physics beyond the Standard Model. We will show how LHCb will be able to increase the precision of these measurements by a large factor and thus would be able to provide a clear signature of new physics from rare decays.

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