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Title

“Lepton Flavour Violation in Upsilon Decay.”

Abstract

With over 530 million $B\bar{B}$ pairs delivered by the PEP-II B-factory, and over 569 publications including the 2008 Nobel Prize in Physics, the BaBar experiment has studied a very broad range of CP violation in the B-meson system, charm, tau, and QCD topics. In fact, the physics at BaBar is so wide-ranging that it threatens to overwhelm any summary. Instead, in this colloquium I will focus on a rare decay that is expected to have a very small Branching Fractions, sensitive to new physics beyond the Standard Model.

Charged lepton flavour violating processes are highly suppressed in the standard model, but they are predicted to be enhanced in several new physics extensions including supersymmetry and models with leptoquarks or compositeness. Data collected with the BaBar detector at the SLAC PEP-II e^+e^- -asymmetric collider at a centre-of-mass energy of 10.36 GeV (which is $\Upsilon(3S)$ resonances energy) were used to search for electron-muon flavor violation in $e^+e^- \rightarrow \Upsilon(3S) \rightarrow e^+\mu^-$ decays. The search was conducted using a data sample in which 118 million $\Upsilon(3S)$ mesons were produced, corresponding to an integrated luminosity of 27 fb^{-1} . There is no evidence of a signal in the $\Upsilon(3S)$ data and we report our results as upper limits on $BF(\Upsilon(3S) \rightarrow e^+\mu^-) < 3.6 \times 10^{-7}$ at 90% CL.

In this talk, I will also provide a brief overview of the new era of high statistics flavour physics with “Belle II” at SuperKEKB machine in Japan after the completion of the first-generation experiments (BaBar and Belle) at asymmetric e^+e^- colliders.