

Search for the Rare Decay $B^0 \rightarrow \tau^+ \tau^-$ at Belle

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In the Standard Model the decay $B^0 \rightarrow \tau^+ \tau^-$ is highly suppressed with a predicted branching ratio of $\mathcal{B}_{\text{SM}}(B^0 \rightarrow \tau^+ \tau^-) \approx 3 \times 10^{-8}$. The BaBar collaboration estimated an upper limit of $\mathcal{B} < 4.1 \times 10^{-3}$ at the 90% confidence level using a data sample of 232×10^6 $B\bar{B}$ pairs.

The search presented in this talk is performed on data collected on the $\Upsilon(4S)$ resonance with the Belle detector at the KEKB asymmetric-energy e^+e^- collider. The data sample contains 772×10^6 $B\bar{B}$ pairs, which is a factor three more than used in the BaBar analysis.

For the analysis one of the B mesons is fully reconstructed in hadronic decay modes using a hierarchical NeuroBayes-based algorithm. Using a multivariate analysis method the background is reduced to reach higher sensitivity.

An expected upper limit on the branching ratio is estimated on simulated Monte Carlo events.

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