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Lepton-pair production in di-pion τ lepton decays

Content

We study the τ−→ντ π− π0 ℓ+ ℓ− (ℓ=e, μ) decays, which are O(αˆ2)-suppressed with respect to the dominant di-pion tau decay channel. Both the inner-bremsstrahlung and the structure- (and model-)dependent contributions are considered. In the ℓ=e case, structure-dependent effects are O(1%) in the decay rate, yielding a clean prediction of its branching ratio, 2.3×10ˆ(−5), measurable with BaBar or Belle(-II) data. For ℓ=μ, both contributions have similar magnitude and we get a branching fraction of (1.6±0.3)×10ˆ(−7), reachable by the end of Belle-II operation. These decays allow to study the dynamics of strong interactions with simultaneous weak and electromagnetic probes; their knowledge will contribute to reducing backgrounds in lepton flavor/number violating searches.

Summary

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