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## Tau lifetime and CP violation in tau decay at Belle

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The tau lepton lifetime is measured using the process  $e^+e^- \rightarrow \tau^+\tau^-$ , where both tau leptons decay to  $3\pi\nu$ . An upper limit on the relative lifetime difference between positive and negative tau-leptons is given. The obtained results are based on a large data sample collected on the Upsilon(4S) resonance with the Belle detector at the KEKB asymmetric-energy  $e^+e^-$  collider. We also present the results of a search for CP violation in  $\tau \rightarrow \nu K_S \pi$ . CP violation in semileptonic tau decays is generally forbidden in the Standard Model but can be induced by the exchange of an exotic scalar such as a charged Higgs in supersymmetric models. Exploiting the large statistics of the Belle data set, we report a model-independent limit for CP violation as well as a significantly improved measurement of the CP violation parameters for specific parameterizations of the hadronic structure functions.

**Primary author:** BELLE, Collaboration (KEK)**Presenter:** SHAPKIN, Mikhail (IHEP)**Session Classification:** 06 - CP violation, CKM and Rare Decays**Track Classification:** 06 - CP violation, CKM and Rare Decays