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Tau lifetime measurement at Belle II

The tau-lepton lifetime represents a fundamental parameter within the Standard Model framework, contributing to the test of lepton flavor universality. Exploiting the vertex detector resolution and the tiny beam spot size at the interaction point, Belle II is expected to improve the present tau-lifetime value. The event topology where one tau decays to three charged pions (3-prong) and the other tau goes to a charged rho meson (1-prong), allows to have an higher event yield respect to 3-prong vs 3-prong topology studied by Belle. Therefore, a measurement with a statistical uncertainty competitive with the world average could already be performed with an early Belle II dataset.

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