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Study of two and three meson tau lepton decay modes with Monte Carlo generator TAUOLA

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TAUOLA is a Monte Carlo generator dedicated to generating tau-lepton decays and it is used in the analysis of experimental data both at B-factories and LHC. TAUOLA is a long term project that started in the 90's and has been under development up to now. In the last years substantial progress for the simulation of the process: $\tau \rightarrow 3\pi \nu_\tau$ was achieved. It is related with a new parametrization of the corresponding hadronic current based on the Resonance Chiral Lagrangian (RChL) and with the recent availability of the unfolded distributions from BaBar analysis for all invariant hadronic masses. The choice of this channel was motivated by its relatively large branching ratio and the already non-trivial dynamics of three-pion final state. A set of the hadronic currents within RChL for other final states with two and three pseudoscalars is also installed in TAUOLA

In this talk we review our results on the three-pion decay mode as well present a new fitting framework. It allows to perform fits for an arbitrary tau decay mode, using either Fortran or C++ code. Using the new framework the theoretical model parameters are fitted to the one-dimensional distributions provided by the BaBar Collaboration, in the case of the three meson decay modes, and to the Belle data, for the two pion form factor. The results of the fit are discussed. Based on the obtained results the pole mass of the involved resonances are estimated.

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