



Contribution ID: 108

Type: not specified

## Predictions on the second-class current decays

$$\tau^- \rightarrow \pi^- \eta^{(\prime)} \nu_\tau$$

Tuesday 30 August 2016 21:20 (20 minutes)

We analyse the second-class current decays  $\tau^- \rightarrow \pi^- \eta^{(\prime)} \nu_\tau$  in the framework of Chiral Perturbation Theory with Resonances. Taking into account  $\pi^0$ - $\eta$ - $\eta'$  mixing, the  $\pi^- \eta^{(\prime)}$  vector form factor is extracted, in a model-independent way, using existing data on the  $\pi^- \pi^0$  one. For the participant scalar form factor, we have considered different parameterizations ordered according to their increasing fulfillment of analyticity and unitarity constraints. We start with a Breit-Wigner parameterization dominated by the  $a_0(980)$  scalar resonance and after we include its excited state, the  $a_0(1450)$ . We follow by an elastic dispersion relation representation through the Omnès integral. Then, we illustrate a method to derive a closed-form expression for the  $\pi^- \eta$ ,  $\pi^- \eta'$  (and  $K^- K^0$ ) scalar form factors in a coupled-channels treatment. Finally, predictions for the branching ratios and spectra are discussed emphasizing the error analysis. An interesting result of this study is that both  $\tau^- \rightarrow \pi^- \eta^{(\prime)} \nu_\tau$  decay channels are promising for the soon discovery of second-class currents at Belle-II. We also predict the relevant observables for the partner  $\eta_{\ell 3}^{(\prime)}$  decays, which are extremely suppressed in the Standard Model.

### Summary

Predictions on the second-class current decays  $\tau^- \rightarrow \pi^- \eta^{(\prime)} \nu_\tau$

**Primary author:** Dr ESCRIBANO, Rafel (Universitat Autònoma de Barcelona)

**Co-authors:** Dr ROIG, Pablo (CINVESTAV); GONZÁLEZ-SOLÍS, Sergi (IFAE-UAB)

**Presenter:** Dr ESCRIBANO, Rafel (Universitat Autònoma de Barcelona)

**Session Classification:** Poster Session and Wine Tasting

**Track Classification:** Poster session