

WORKSHOP

tau lepton decays: hadronic currents from data of Belle and BaBar and new physics signatures at LHC .

Institute of Nuclear Physics PAN, Cracow Poland, Radzikowskiego 152
14-19 May 2012

Purpose of the meeting

Tau leptons, elementary constituents of matter are of fundamental importance for science. Better modelling of their decays in modern language of hadronic interactions at intermediate energies may lead to a breakthrough in understanding relation between quantum chromodynamics and effective models of hadrons interactions. This is important not only for description of hadrons interactions themselves, but also for astrophysics. Evolution of stars and modelling of early Universe depends on strong interactions. Tau leptons are used for establishing signatures of New Physics at LHC measurements, better understanding of their decays may lead to better separation between signals of new physics and backgrounds.

The purpose of the meeting is to discuss work on and embed, for tau lepton decays, the theoretical predictions calculated from models like Resonance Chiral Theory, into phenomenologically useful tools. Better algorithms for confronting theoretical predictions with experimental data have to be also prepared. Then, final adaptation of theoretical predictions (fits to the data of the effective couplings and masses) has to be performed. If after the fits discrepancies remain, the model under investigation can be excluded but guidance for the further development is obtained.

Discussing tools and progressing in work within such a programme is the main purpose of the meeting. Thanks to the results of this project physics gains of high energy experiments will be improved as well, in particular of LHC experiments. Better description of the data, in form of hadronic currents consistent with theoretical models, may give new starting point for studies of QCD at low and intermediate energies. In these regimes perturbative methods are so far of limited use and need refinement. Such outcome would be of the great importance and can provide a breakthrough.

Related topics are expected to be discussed during the meeting as well and the complete frame of this workshop will be organized to stimulate present work on research concentrated around TAUOLA Monte Carlo program.

TAUOLA Monte Carlo is being developed since 1990. Its original authors are:

R. Decker, J. H. Kuhn Karlsruhe. S. Jadach, M. Jezabek Z. Was IFJ PAN Krakow.

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Main points of the programme:

We plan morning sessions of two-three 45 min talks followed by working sessions in afternoon in ad hoc establishing groups of particular interest. We expect at least three topics for work:

- A- modelling of hadronic currents for tau decays
- B- fits of such currents to tau decay data
- C- use of tau lepton decays in LHC experiments.

Another theme:

- D- bremsstrahlung in decays of Z W and inter-relation with reconstruction of electrons/
muons

We do not plan any proceedings, but some of us will work on publications related to subjects A, B, C. The actual authorship will not be guaranteed nor constrained to the workshop participants.

Technical aspects:

- We do not plan any conference fee, but at the same time we do not have any support available. We continue investigating possibilities.
- Participation is by invitation only. If you are interested to participate send an e-mail to any of us. Please check if you have received confirmation e-mail from the secretariat. We have no arrangements with the hotels or for travels, but we can offer advice. Some minimal coordination for Institute access permits, Wi-Fi or office space will be provided.
- Web page of our Institute (meeting site) with address etc. <http://www.ifj.edu.pl>
- Detailed program, talks, participants:
<https://indico.cern.ch/conferenceOtherViews.py?view=standard&confId=188018>
and
<http://www.cern.ch/wasm/public/meetingB.pdf>
- Accommodation - some hotels in Cracow often used by our guests can be found here
<http://wasm.web.cern.ch/wasm/public/Accommodation.pdf>