Contribution ID: **21** Type: **not specified**

Simulation and optimization of the PANDA detector to measure the form factor of the Ds semileptonic decay

Thursday, 19 September 2013 11:00 (30 minutes)

Semileptonic decays Ds-> e + ν + π,η,η' are an excellent environment for precision measurements of the CKM matrix element |Vcd| and |Vcs|. These decays are governed by both the weak and strong forces; extraction of the weak CKM parameters requires knowledge of strong interaction effects. These can be parameterized by form factors, which encapsulate the QCD bound-state effects. Techniques such as lattice quantum chromodynamics (LQCD) offer increasingly precise calculations of these form factors, but as the uncertainties in the predictions shrink, experimental validation of the results becomes increasingly important. Furthermore, in these decays, the gluonic contributions enter that couple to the singlet component of the η and η', and that the mass corrections are more important due to the larger strange quark mass. The important observables are the branching fractions and the q2 variation of the transition form factor. Therefore, the investigation of this system opens a new approach to improve the mixing angle as well.

In the reconstruction procedure, we focus on developing the software and evaluating the expected precision of these measurements with the Monte Carlo simulation studies of the physics performance of the PANDA detector. The related decay models in this chain are checked via Dalitz plot analyses; the present version of EvtGen in PANDAROOT has been enhanced by a new model describing the Ds- ->K+K-pi- decay. With the help of theoretical predictions of the cross section, the production rate is estimated. The next steps include detailed investigations of the reconstruction efficiency and resolution, incorporating kinematic fit procedures to extract information on the unmeasured neutrino in the final state.

Primary author: Ms CAO, Lu (IKP1, Forschungszentum Juelich)

Co-author: Prof. RITMAN, James (IKP1, Forschungszentrum Juelich)

Presenter: Ms CAO, Lu (IKP1, Forschungszentum Juelich)

Session Classification: Talks and Discussions