

CERN Joint EP/PP Seminars

SPEAKER:	Brigitte Bloch-Devaux (IRFU/SPP - CEA Saclay
TITLE:	Probing non perturbative QCD with kaon decays: precise results by NA48/2
DATE:	Tue 21/04/2009 16:30
PLACE:	Main Auditorium **

ABSTRACT

The NA48/2 experiment at the CERN SPS has accumulated a total sample of several billions K^{\pm} decays in 2003-2004. Primarily setup to search for direct CP violation charge asymmetries in K to 3π decays ($K^{\pm} \rightarrow \pi^{\pm} \pi^{0} \pi^{0}$ and $K^{\pm} \rightarrow \pi^{\pm} \pi^{-} \pi^{-}$), the experiment has also collected unprecedented statistics of rare decay modes.

The analyses of ~60 millions $K^{\pm} \to \pi^{\pm} \pi^{0} \pi^{0}$ (K3 π) decays and more than 1 million $K^{\pm} \to \pi^{\pm} \pi^{-} e^{\pm} V$ (Ke4) decays give independent but complementary approaches to the study of low energy $\pi\pi$ scattering very close to threshold.

Precise values of a₀ and a₂, the Isospin 0 and 2 S-wave $\pi\pi$ scattering lengths, are extracted with an experimental uncertainty of few percents, allowing accurate tests of Chiral Perturbation Theory predictions. These analyses determine simultaneously the form factors (Ke4) and Dalitz plot parameters (K3 π) with such good precision to reveal evidence for new genuine terms needed to accurately describe the transition amplitudes.

A very fruitful collaboration was developed with several theory groups to bring the control of the theoretical predictions at a level similar to the achieved experimental precision.