



LHC Seminar

SPEAKER: Albert Puig Navarro (Ecole Polytechnique Federale de Lausanne (CH))

TITLE: **Observation of photon polarization in the $b \rightarrow s\gamma$ transition at LHCb**

DATE: Tue 18/03/2014 11:00

PLACE: Main Auditorium

ABSTRACT

The Standard Model predicts that the photons emitted in flavor-changing neutral current b to s gamma transitions are predominantly left-handed. However, the photon polarization has never been observed in a direct measurement and remains largely unexplored. Several extensions of the Standard Model predicting a significantly different photon polarization have not been yet ruled out by other measurements, such as the inclusive B to Xs gamma decay rate.

This talk will focus on the recent study of the radiative B to $K\pi\pi\gamma$ decays performed using data collected in pp collisions with the LHCb detector at 7 and 8 TeV center-of-mass energies. The distribution of the angle of the photon direction with respect to the plane defined by the final-state hadrons in their rest frame is studied in intervals of $K\pi\pi$ mass and the asymmetry between the number of signal events found on each side of the plane is presented.

This approach is conceptually very similar to the historic Wu measurement of parity violation from 1957. The first direct observation of the photon polarization in the b to s gamma transition is reported with a significance of 5.2 standard deviations. Future prospects for the extension of this measurement and for the extraction of photon polarization in LHCb will also be discussed.