

## The Return of Kaon Flavour Physics

Thursday 11 January 2018 09:00 (45 minutes)

Kaon flavour physics has played in the 1960s and 1970s a very important role in the construction of the Standard Model (SM) and in the 1980s and 1990s in its tests in particular with the help of CP violation in  $K_L \rightarrow \pi\pi$  decays represented by  $\varepsilon_K$  and the ratio  $\varepsilon'/\varepsilon$ . In this millennium this role has been taken over by  $B_{s,d}$  and  $D$  mesons. However there is no doubt that in the coming years we will witness the return of kaon flavour physics with the highlights being the measurements of the theoretically clean branching ratios for rare decays

$K \rightarrow \pi\nu$  and the improved theory of the ratio  $\varepsilon'/\varepsilon$ , of the  $K^0$ - $\bar{K}^0$  mixing mass difference  $\Delta M_K$  and of the decays  $K_L \rightarrow \mu^+\mu^-$  and  $K_L \rightarrow \pi^0\ell^+\ell^-$ . They all are very sensitive to new physics (NP) contributions and  $B_{s,d}$  mixing observables and decays like  $B_{s,d} \rightarrow \mu^+\mu^-$ ,  $B \rightarrow K(K^*)\ell^+\ell^-$ ,  $B \rightarrow K(K^*)\nu\bar{\nu}$  and  $B \rightarrow D(D^*)\tau\nu$  will be crucial. This talk summarizes several aspects of this exciting field.

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