

# BEACH 2010 - IX International Conference on Hyperons, Charm and Beauty Hadrons



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## Measuring KS and KL lifetimes at KLOE

A phi-factory offers the possibility to select pure kaon beams: neutral kaons from  $\phi \rightarrow K_S K_L$  are in fact produced in pairs and the detection of a  $K_S$  ( $K_L$ ) tags the presence of a  $K_L$  ( $K_S$ ). This allows to perform precise measurement of kaon properties. We are presently finalizing new determinations of the  $K_L$  and  $K_S$  lifetimes using the whole KLOE data set, consisting of more than  $10^9$   $\phi \rightarrow K_S K_L$  decays. Both determinations benefit from a precise knowledge of kaon momenta. The  $K_L$  lifetime, which has been already measured by KLOE with 0.6% accuracy using 20% of the total data sample (PLB 626, 2005, 15), will be extracted from the proper time distribution of  $K_L \rightarrow 3\pi^0$  decays, tagged by a  $K_S \rightarrow \pi^+\pi^-$  decay on the opposite hemisphere of the apparatus. A competitive measurement of the  $K_S$  lifetime is obtained from the proper time distribution of  $K_S \rightarrow \pi^+\pi^-$  decays.

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