



ID de Contribution: 32

Type: Non spécifié

## Search of $K_S \rightarrow e^+e^-$ decay with KLOE

*mardi 4 mars 2008 17:56 (5 minutes)*

The KLOE detector is operated at DAΦNE, an  $e^+e^-$  collider running at a center of mass energy  $W = m_\phi \sim 1019.45$  MeV.  $\phi$  mesons decay 34% of the time to a  $K_S K_L$  pair. Detection of a  $K_L$  thus signals the presence of, “tags”, a  $K_S$  and vice versa. With this technique, we select a pure  $K_S$  beam, which permits studies of suppressed  $K_S$  decays without the overwhelming background from the  $K_L$  component. We present the result of a search for the  $K_S \rightarrow e^+e^-$  decay obtained from the whole data set. This is based on a sample of  $\sim 650$  millions of  $K_S$  decays tagged by the detection of a  $K_L$  interaction in the calorimeter.

$K_S \rightarrow e^+e^-$  decay is a  $\Delta S = 1$  weak neutral current process, suppressed by Standard Model at the level of  $\sim 2 \times 10^{-14}$ . These events are searched by selecting two charged tracks from the interaction region, and exploiting the high resolution of our drift chamber in reconstructing the kaon invariant mass. Further rejection comes from calorimeter particle identification. No events survive our selection criteria, resulting in an upper limit on the BR of  $9.3 \times 10^{-9}$ ,  $\sim$ at-90%-CL.

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**Classification de Session:** Young Scientist Forum 1