

# $K_L \rightarrow \pi^0 \nu \bar{\nu}$ experiment at KEK 12-GeV PS — E391a —

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The  $K_L \rightarrow \pi^0 \nu \bar{\nu}$  decay is one of the most attractive phenomena for the study of the CP violation. The branching ratio can be calculated with a small theoretical ambiguity, which will provide a clean determination of a basic parameter of the present particle physics. It will also play an important role for the search of the new physics as well as for the fundamental understanding of the CP-violation.

The present experimental upper-limit of its branching ratio is  $5.9 \times 10^{-7}$ , which is far above the Standard Model (SM) prediction of  $3 \times 10^{-11}$ . Instead of leaping over this large gap at once, we planned to carry out a kind of pilot experiment at KEK 12-GeV PS, E391a, which has the sensitivity close to the SM prediction. The E391a is scheduled to start the physics run in 2003. It will give us many important informations about the situation in the tiny branching ratio region, which will guide us to the next stage of the experiment using the newly built high-intensity proton synchrotron.

For the experiment, several important R&D and beam-line construction have been done successfully.

We report the current status of the E391a experiment and the result of the series of beam test and R&D.