

E391a is searching for $K_L \rightarrow \pi^0 \nu \bar{\nu}$ decay that is the most attractive flavor changing neutral current (FCNC) process in the CP violation study. Since the decay probability is well calculated with a negligible ambiguity in the standard model (SM), it provides the cleanest test of the SM and any deviation from the expectation will be a clear signal of the new physics. The experiment has performed data taking successfully for 100 days from February to July 2004. During the data taking, it was confirmed that the pencil K_L beam and the detector system including vacuum work properly as designed. Fig. 1 shows a final plot of prompt analysis using 2% of obtained data. With such a small fraction of data, the experiment already reaches a sensitivity close to the current experimental limit. In addition to a detailed analysis with higher statistics, the second data taking has performed with a few upgrades of detector system pointed by the prompt analysis for 45 days from February to March 2005.

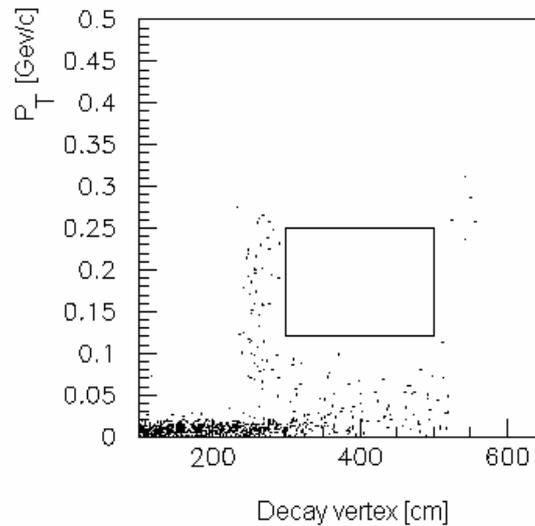


Fig. 1. Decay vertex versus transverse momentum distribution of reconstructed π^0 from detected two gammas. The rectangular box indicates a signal region to search for the $K_L \rightarrow \pi^0 \nu \bar{\nu}$ events. The events surrounding the signal box are identified after a preliminary background analysis as $K_L \rightarrow \gamma \gamma$ decays around $P_T=0$, events due to interaction of beam particle with upstream (vertex=300 cm) and downstream (vertex=550 cm) detectors, and events from several sources including K_L decays at lower P_T below the signal box.