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E471

The E471 experiment[1] for the search for deeply-bound $K^- - ppn$ state[2] has finished its first beam time(for 130 shifts) in October 2002, and the data analysis is still in progress. In the experiment, neutron time-of-flight is measured for the determination of its momentum distribution from stopped K^- in the liquid ^{4}He target, and 8MeV/c momentum resolution has been achieved with 2.3m of mean flight distance. Reaction point determination with points of the closest approach on incoming kaon track and outgoing pion(or proton) track worked successfully(Fig.1), and stopped event was selected precisely with the information(Fig.2).

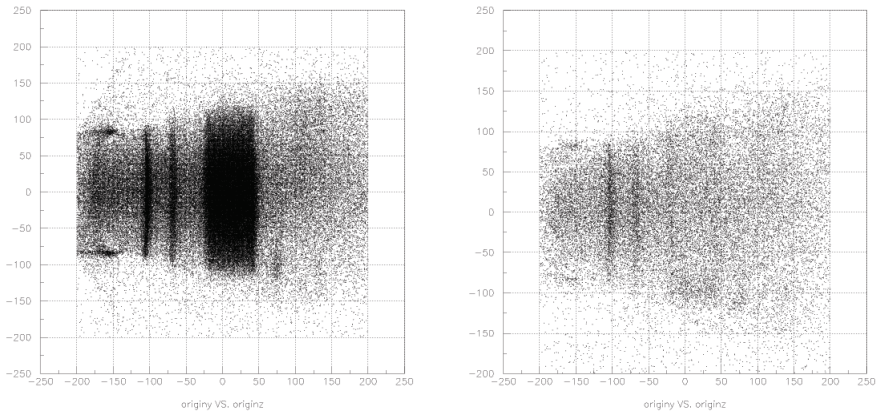

Figure 1: Reaction point distribution, when target is full(left) and empty(right). The abscissa is beam direction, and the ordinate is vertical. We can see the cap of the target cryostat($z \approx -105$), and the radiation shield($z \approx -70$) as well.

Its preliminary result indicates the existence of a peak-like structure on neutron momentum spectrum around 470MeV/c, which is corresponding to kaon binding energy of 160MeV, with rather smaller branching ratio than what is expected beforehand. The total statistics is not necessarily enough to be definitive, and E471 group requested the beam time extension. The second beam time(42 shifts) is scheduled on June and July, 2003.

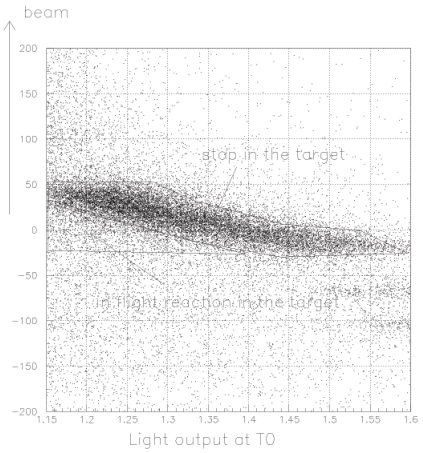

Figure 2: Correlation between reaction(stop) point along the beam axis(ordinate)and light output in a scintillator placed just upper stream of the target(abscissa). This correlation is used to select stopped event.

Because the binding deduced from the peak candidate is far deeper, neutron background from negative pion 2-nucleon absorption can not be serious on the neutron momentum spectra in case of ^{4}He target. Therefore, we can make target thicker, and same order of statistics is expected in the second stage with 2.5 times thicker target.

References

[1] M. Iwasaki *et al.*, Nucl. Inst. Methods **A473** (2001) 286.

[2] Y. Akaishi and T. Yamazaki, Phys. Rev. C65 (2002) 044005.