

**Status report of KEK-PS T500, T530**  
**(Performance Test of the TOF/Čerenkov Counters for the Jlab E01-011 Experiment)**

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Jlab E01-011 collaboration ( $\Lambda$ -hypernuclear spectroscopy through the  $(e,e'K^+)$  reaction) has been developing detector packages for coming beamtime to be allocated in 2004.

The mass-production type of the detectors were fabricated taking the two test beamtime results (T494, Dec 2001; T500, May 2002) into account. Before shipping of the detectors to US, the final tune was carried out in December 2002 (T530).

We tested following counters with 1.05~1.35 GeV/c unseparated p,  $K^+$ ,  $\pi^+$  beam at T1 beamline. Our detector achieved :

1. TOF counter for the electron spectrometer achieved a time resolution of  $\sigma = 70$  ps.
2. TOF counter for a new high resolution kaon spectrometer (HKS) achieved  $\sigma = 55$  ps time resolution.
3. Water Čerenkov counters with the amino-G-salt wavelength shifter achieved  $\sim 98\%$  of detection efficiency for  $K^+$ s and 2% contamination of protons. It satisfies our requirements of  $5 \times 10^{-4}$  suppression for protons with 2 layers of them.
4. Aerogel Čerenkov counters ( $n=1.05$ ) gave 19.3 photoelectrons for 1.2 GeV/c pions. Setting the threshold at an adequate value, we achieved  $\pi$  rejection efficiency of  $10^{-4}$  and kaon kill rate less than 5% with three layers of them.

After the T530 beamtime, most of detectors have shipped to Jlab in March, 2003 and they are under bench test for final tune at Jlab.

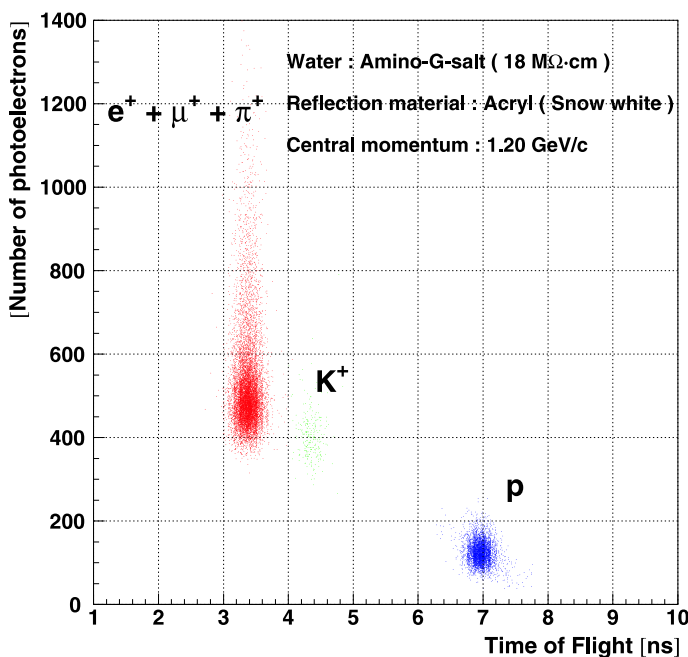


Fig. 1 The *Time of Flight* vs. number of photoelectrons measured with the HKS water Čerenkov counter for 1.2 GeV/c, protons, kaons, and light particles. The diffusion reflectance was intensively studied for various materials such as Millipore membrane, Goretex sheet, titanium-dioxide paint and acrylic plate. Finally, the study shows the container made of white acrylic plate without any additional reflection materials gives sufficient performance.