

# Development of Matrix Trigger Module for J-PARC E03/E07

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*Measurement of  $\Xi^-$ -atomic X-rays from Fe target* which is called J-PARC E03 and *Systematic Study of Double Strangeness System with an Emulsion-Counter Hybrid System* which is called J-PARC E07 will be performed at J-PARC K1.8 beam line. Both experiments aim for studying Baryon-Baryon interaction at strangeness  $S = -2$  sector by manipulating  $\Xi^-$  hyperons captured in nucleus which are produced from quasi free  $p(K^-, K^+)\Xi^-$  reaction.

KURAMA spectrometer, which was used for KEK-PS E373 experiment, is essential for detecting scattered  $K^+$  particles and identifying the  $(K^-, K^+)$  reaction in both experiments. It consists of a magnet, aerogel Cherenkov counters, drift chambers and scintillator counters which involve three hodoscopes FBH, BH2 and TOF counters. Compared with KEK-PS E373, about 100 times higher beam rate and trigger rate are expected in these two experiment. To make the high trigger rates manageable, we are now developing 3 dimensional matrix momentum trigger module through which momenta region of physical interest in the experiments can be selected by using hit combination of the three counters which are composed of multiple segments. Its performance attained decision time of 300ns for  $32 \times 64 \times 32(\text{channel}^3)$  inputs with the previous firmware. Simulation to obtain expected hit pattern is now in progress and firmware is in the process of revision to attain decision time of less than 150ns. The results will be presented in this conference.

- [1] K. Tanida et al., J-PARC E03 proposal.
- [2] K. Tanida et al., Hyperfine Interactions. Vol 193. pp 81-87(2009)
- [3] K. Imai et al., J-PARC E07 proposal.