

# Weak and Annoying Backgrounds on AMATERAS

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We manage the cold-neutron disk-chopper spectrometer AMATERAS[1] installed in MLF, J-PARC and perform various research and development for advancement of chopper type spectrometers. The reduction of background is one of the important subjects in the spectrometers. In AMATERAS, we have reduced the background to a low level by past various methods. As a result, low-intensity backgrounds that we hardly minded so far become the problems. They are a background by  $\gamma$ -ray and a background caused by the environmental neutrons.

Figure 1 shows the example of the  $\gamma$ -ray background. This background is caused by the prompt  $\gamma$ -ray that occurred by the sample oneself and the cadmium metal for background reduction. On AMATERAS  $^3\text{He}$  detectors which are low sensitivity of  $\gamma$ -ray are used, but nonetheless the  $\gamma$ -ray becomes an obstacle of the measurements. Figure 2 shows the time-independent background that it is thought that it is caused by the environmental neutrons. This background is constant regardless of the operation of the proton accelerator and ON/OFF of the neutron beam. We will report the actual conditions and the measures about these two kinds of backgrounds.

## Reference

[1] K. Nakajima, et al., *J. Phys. Soc. Jpn.* **80** suppl. B, SB028 (2011).

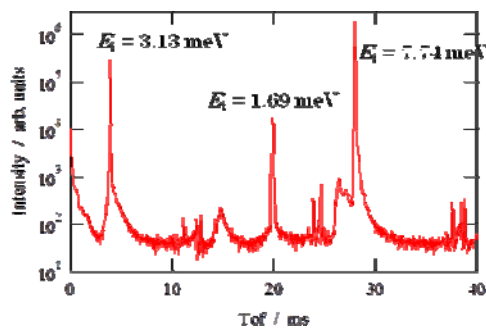


Fig. 1 Example TOF diagram of  $\gamma$ -ray background which are shown as several peaks in 10 – 13 ms, 23 – 25 ms and 37 – 40 ms by the multi- $E_i$  measurement.

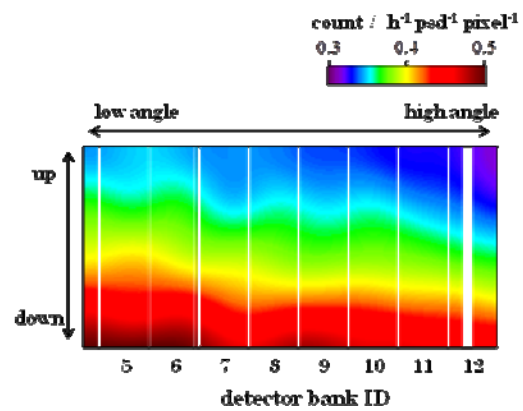


Fig. 2 Intensity map of time-independent background caused by the environmental neutrons.