

The continuous measurement system of tritium at Fukushima nuclear power plant

Yuichiro Saitou, Hirofumi Yamamoto, Hitoshi Yoshida, Yoshihiro Yamamoto and Kazuo Taniguchi

Techno-Bridge Co., LTD.

Introduction and Objective

Fukushima Daiichi nuclear power plant suffered catastrophic damage by the earthquake and tsunami on March 11, 2011.

As a results a great deal of contaminated water has generated when groundwater touched the damaged reactors and debris.

ALPS(Advanced Liquid Processing System) treated water from which almost all kinds of nuclides other than tritium had been removed is stored in tanks at power plant.

The Government of Japan has decided to dilute ALPS treated water with seawater and discharge it into the sea.

It is necessary to measure everything's tritium concentration density of ALPS treated water which is discharged from the point of view for which safety and relief are secured.

So, the continuous measurement system of tritium that we have developed.

Outline of Measurement System

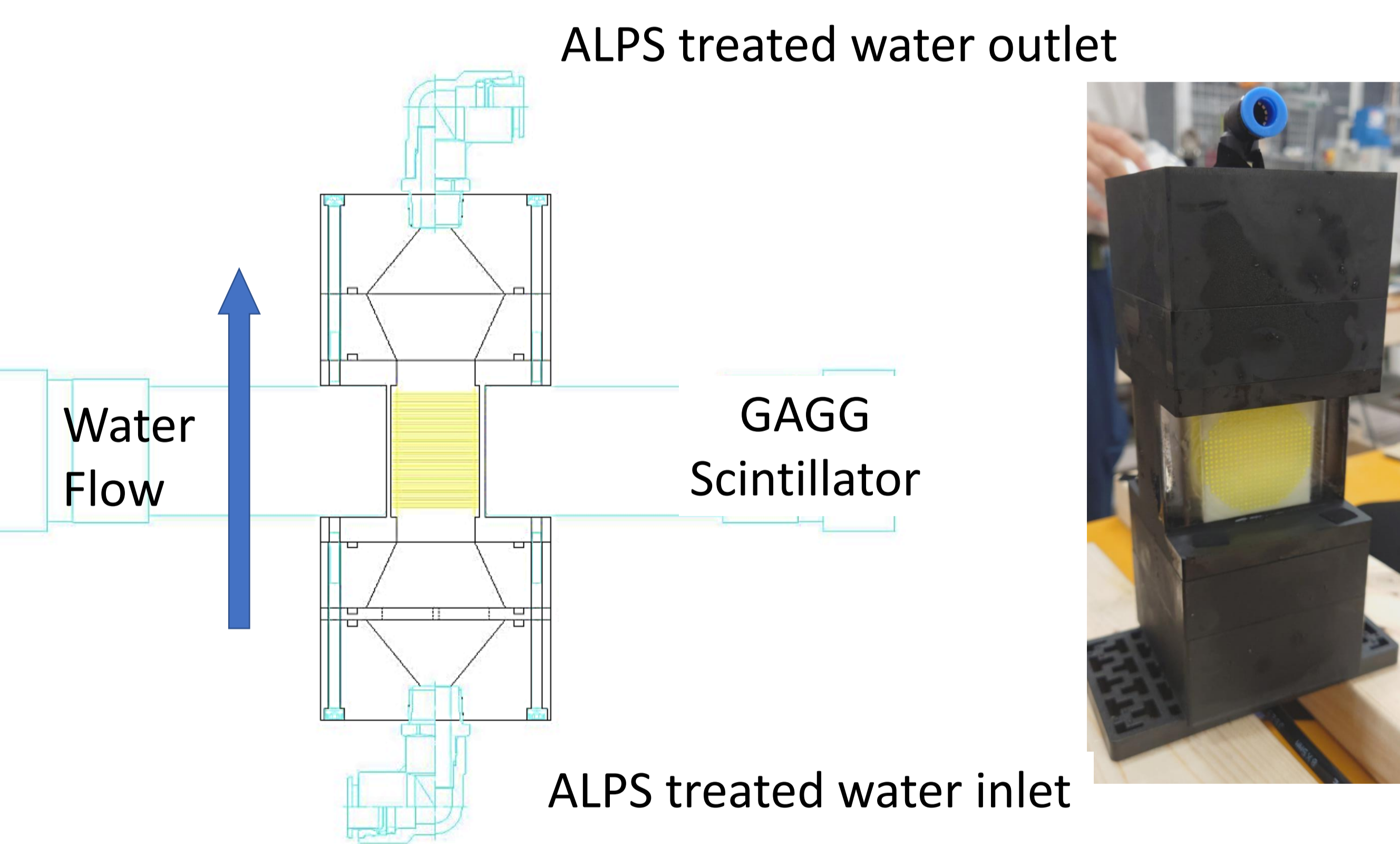


Fig. 3 Scintillator unit

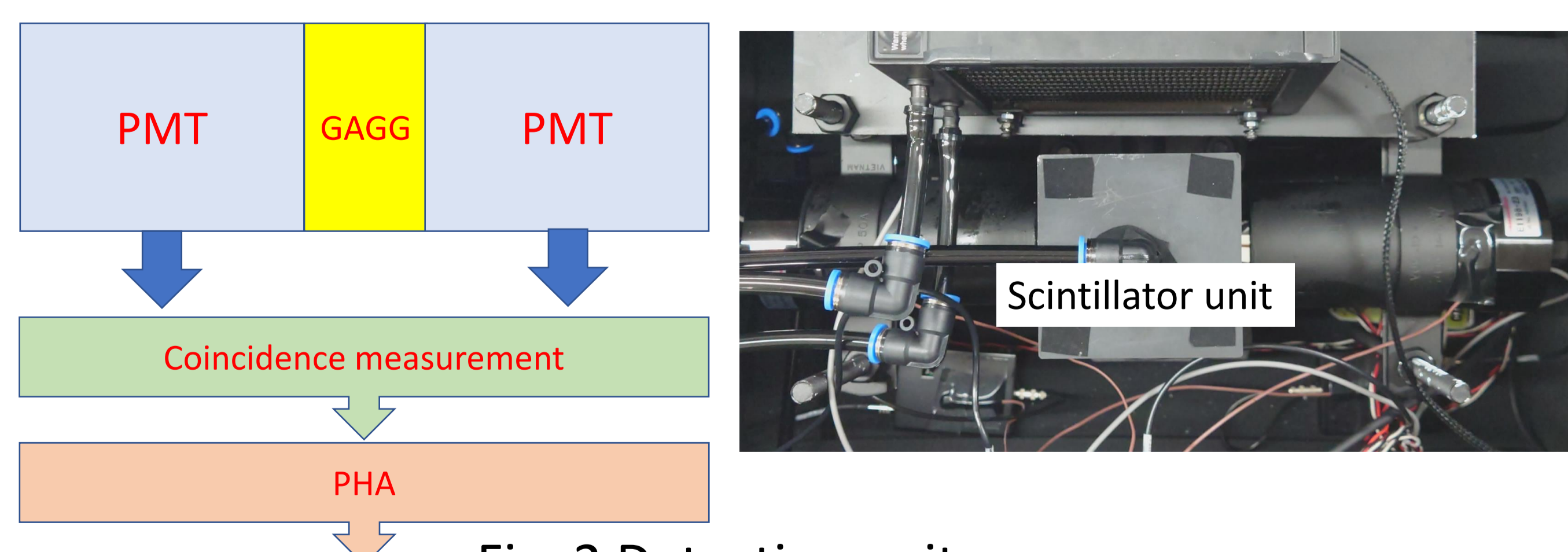


Fig. 2 Detection unit

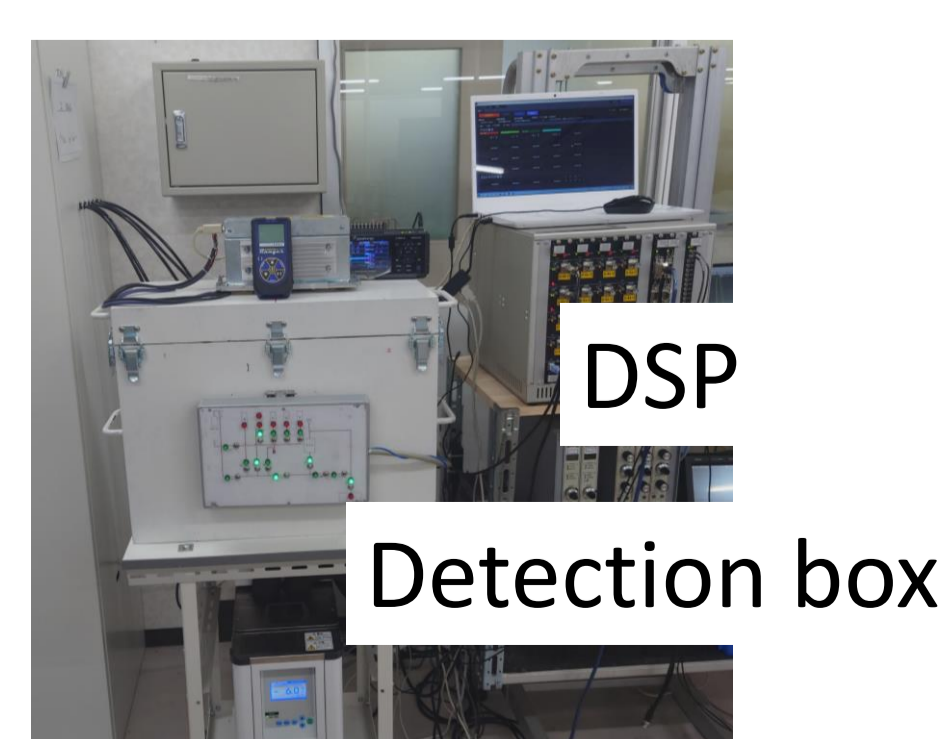


Fig.3 Measurement system

Conclusions

We have succeeded to measure low energy the beta ray of tritium emits.

LLD is 651kBq/L at measurement time of 30sec. Expected to measure 1,000 Bq/L on a 10-time moving average and parallel measurement.

We were convinced that continuous tritium measurement of ALPS treated water was possible at Fukushima Daiichi Nuclear power plant.

Results

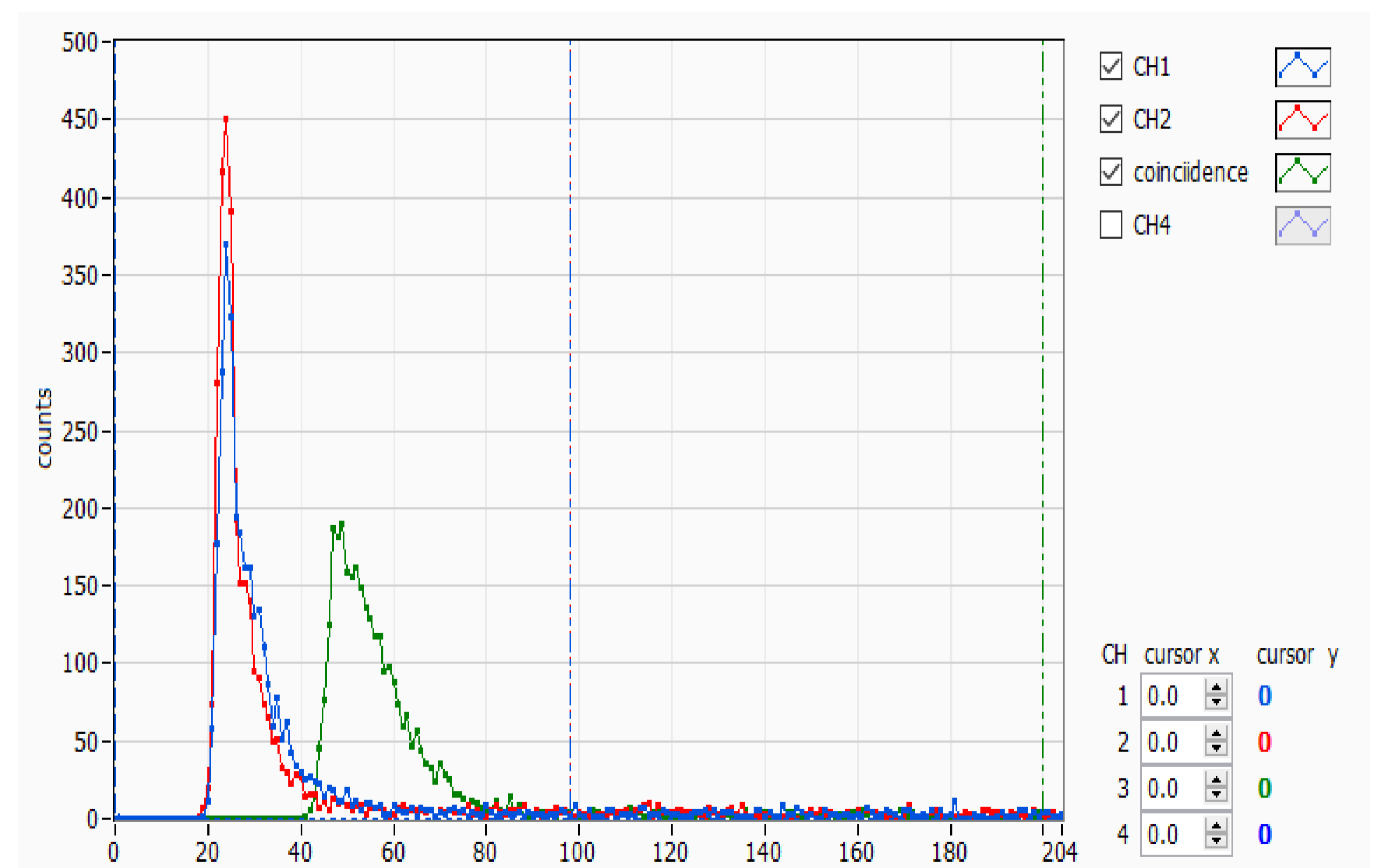


Fig.4 Tritium spectrum
Coincidence time 120ns, Threshold 25

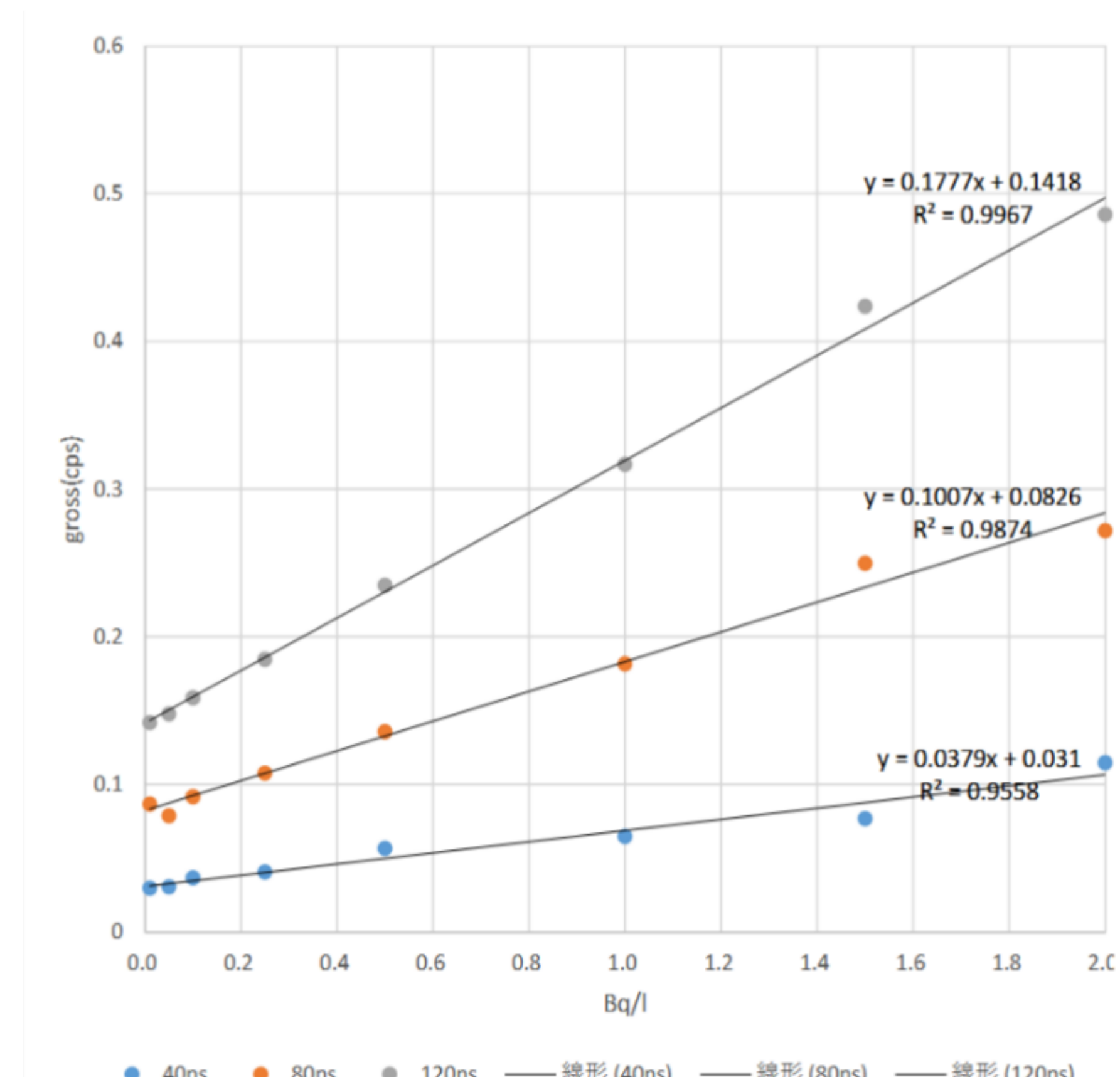


Fig.5 Calibration curve