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Development of a new device control system for β-NMR experiments

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We have newly developed a device-control system of a β-NMR apparatus for the measurement of nuclear electromagnetic moments of rare isotopes. In this development, we installed a fast switching system into a high-power tank circuit to apply a strong oscillating magnetic field [1] and a new Programmable Sequence Generator module for its control. The system enables to conduct an NMR frequency scan with wide frequency windows by dynamically changing the circuit's resonant frequency. In addition, logical electric-circuit modules of the data taking system were replaced by a CPLD module, in which their functions can be programmed.

The performance of the new system was studied in a β-NMR experiment with spin-polarized ^{20}F isotopes carried out at the RIBF facility. The ^{20}F isotope was produced in the (*d*, *p*) reaction with a polarized deuteron beam at E/A = 7 MeV on a CaF_2 target. Details of the new β-NMR system and the experimental result will be given in the presentation.

References

[1] K. Minamisono *et al*., Nucl. Instr. and Meth. in Phys. Res. A **589,** 185 (2008).