

Stautus and research plan

Research Center for Electron Photon Science
Hikari Wauke

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1 My research status and future

My research is to determine the neutron distribution radius of unstable nuclei by electron scattering. So far, it was very difficult to directly measure the neutron distribution of nuclei by only electromagnetic interaction. However, recently, it is believed that the neutron distribution of nuclei can be determined using only electron scattering by measuring the 4th moment of the charge density distribution^[1]. We will conduct the measurement of the 4th moment of the charge density distribution by the electron scattering with the SCRIT(Self-Confining Radioactiv-isotope Ion Target) method in order to determine the neutron distribution radius of unstable nuclei. The SCRIT method was developed by the SCRIT research group as an unstable nuclear target generation method that can perform electron scattering experiments with a small number of targets^[2]. We will measure the 4th moment of the charge density distribution of unstable nuclear at the SCRIT electron scattering facility constructed at RIKEN RI Beam Factory^[3]. I will develop a new detector for experiments in the low momentum region, which is high sensitive to the 4th moment of the charge density distribution. I will perform an experimental simulation to estimate the momentum resolution and location of the new detector, the number of nuclear targets needed for the measurement and the duration of the experiment. Currently, I'm making an experimental simulation program. I was selected by JRA and I'm planning to stay at RIKEN.

In the future, we will prepare the experiment and develop the detector based on the above simulation.

2 Research plan

My research plan is shown in the table. I need to have GSPs 10P and GEPs 13P for a GPPU degree. I plan to go to Tohoku University about once a month for the GPPU seminars and the GPPU experiments. In order to complete my research, I need discussion not only with experimental reseraches but also with theoretical researchers. I will discusse foreign researchers through online meetings as overseas training in this year.

I haven't decided on overseas training yet, but since there are many collaborators from overseas, I will have the opportunity to discuss it in the near future.

Table 1: Research plan

| Year | GPPU credit plan |
|------|---|
| D1 | GPPU Seminar(GSP 2P) |
| | December,2020 : GPPU school(GSP 3P) |
| | GPPU Experimental Course(GEP 7P) |
| | Overseas training by online conference(2 month) |
| D2 | GPPU Seminar(GSP 2P) |
| | GPPU school(GSP 3P) |
| | GPPU Experimental Course(GEP 6P) |
| | Overseas training(1 month) |
| D3 | Writing a doctoral thesis in English & QE2 |

[1] H.Kurasawa and T.Suzuki, PTEP 10.1093/ptep/ptz121

[2] M.Wakasugi *et al* : Nucl. Instr. Meth. **A532**, (2004) 216–223

[3] T.Suda *et al* : Prog. Theor. Exp. Phys. **03C008**, (2012)