



Maya TAKECHI, Ph.D. (Dr. Sci.)

Assistant Professor

Program: Fundamental Sciences

Area: Physics

Professional Expertise

Experimental Nuclear Physics

Research Fields of Interest

My major topic of research is to study the radii of atomic nuclei. Nuclear radii of stable nuclei are almost proportional to $A^{1/3}$ (A is the sum of the number of protons and neutrons in the nucleus.). This fact indicates that nucleons are uniformly packed in the nucleus. The nucleon density is about 0.17 nucleons/fm³, which corresponds to 10¹⁴ g/cm³.

In the early study of unstable nuclei, some huge nuclei of which radii are beyond the law of $A^{1/3}$ have been found. This phenomenon is interpreted as neutron halo formation. In the neutron halo nuclei, the weakly-bound excess neutron(s) exists far out side of the main part of the nucleus.

The probability of nuclear reaction can be related to the nuclear size. In other word, if we measure the nuclear reaction probability of unstable nuclei, we can measure the nuclear size. Using radioactive (RI) beam provided by recent accelerator institute, we can perform experiments to measure nuclear reaction. Recently, we study nuclear radii of very neutron-rich nuclei using RI beam from RIKEN, RI beam factory. The purposes of this study are search for new halo nuclei, study of the neutron skin structure, and the discovery of new phenomena.

Education

2006: Ph.D. in Physics, Graduate School of Science, Osaka University, Japan

2003: M.S. in Physics, Graduate School of Science, Osaka University, Japan

2001: B.S. in Physics, Department of Physics, Osaka University, Japan

Professional Societies and Activities

1. The member of Japan Physics Society, since 2002.

Awards

1. "Award for Outstanding Young Physicists" for Doctoral Thesis"
(Nuclear Physics Forum, Japan, March, 2006)

Major Publications

Papers

[1] "Search for halo nucleus in Mg isotopes through the measurements of reaction cross sections towards the vicinity of neutron drip line",

EPJ Web of Conferences, vol.707, pp.02101, 2014

[2] "Interaction cross sections for Ne isotopes towards the island of inversion and halo structures of ²⁹Ne and ³¹Ne",

Phys. Lett. B, vol.707, pp.357, 2012

[3] "A comparison of total reaction cross section models used in particle and heavy ion transport codes" *Advances in Space Research*, vol.49, pp.812, 2012.

[4] "Observation of a Large Reaction Cross Section in the Drip-Line Nucleus ²²C" *Phys. Rev. Lett.*, vol.104, pp.062701, 2010.

[5] "Reaction cross sections at intermediate energies and Fermi-motion effect" *Phys. Rev. C*, vol.79, pp.061601(R), 2009.