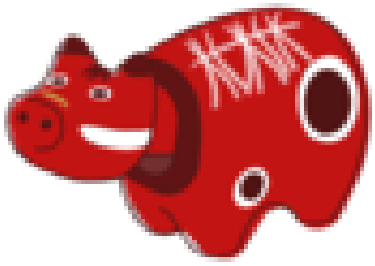

Contribution ID: **73** Type: **not specified**

Measurement of the interaction cross sections for nuclei near the N=Z line between 40Ca and 56Ni

Wednesday, 5 March 2025 15:39 (1 minute)

The interaction cross section is one of the physical quantities that can be used to deduce the nuclear radius, and its measurement contributes to the understanding of the structure of unstable nuclei. While charge radii provide information about the proton distribution, deriving nuclear matter radii from interaction cross sections allows us to gain additional insights into the neutron distribution inside the nucleus. Furthermore, a previous study [1] has reported a linear correlation in the charge radius difference of mirror nuclei as a function of isospin dependence. Investigating whether a similar correlation exists for nuclear matter radii may provide further insights into isospin symmetry breaking.
In this study, we measured the interaction cross sections for the nuclei around 40Ca and 56Ni, as well as for their neighboring mirror nuclei, as part of the S3CAN (Symbiotic Systematic and Simultaneous Cross-section Measurements for All over the Nuclear Chart) program within the TRIP use case. The experiment was conducted at the RI Beam Factory (RIBF) of RIKEN using the BigRIPS separator. A 70Zn primary beam was accelerated to 345 MeV/nucleon and irradiated onto a beryllium target placed at F0, generating a secondary beam containing the nuclei of interest via projectile fragmentation. The secondary beam was transported through BigRIPS, where particle identification was performed using the Bρ-TOF-ΔE method. A wedge-shaped carbon target with a central thickness of approximately 1.5 g/cm² was placed at the F5 focal plane. By comparing the particle identification before and after the target, the interaction cross section was determined using the transmission method.
We will discuss the mass-number dependence of the obtained interaction cross sections and derived nuclear matter radii, as well as the differences in nuclear matter radii between mirror nuclei.

Reference
[1] T. Li et al., Atomic Data and Nuclear Data Tables, 140, (2021) 101440.

Type of contribution

poster

Are you a student or postdoc?

yes

Primary author: INOUE, Chinami (Tokyo City University)

Co-authors: MATSUYAMA, Kento (Tokyo city university); NISHIMURA, Daiki (Tokyo City Univercity); MORIGUCHI, Tetsuaki (Univ. of Tsukuba); TAGUCHI, Ryo (Osaka University); TAKAYAMA, Gen (Osaka Univ.); TANAKA, Masaomi (Kyushu Univ.); YANO, Asahi (Univ. of Tsukuba); ADACHI, Kazuhiro (Niigata University); AMITANI, Mei; BABA, Hidetada (RIKEN Nishina Center); FUKUDA, Mitsunori (Osaka University); FUKUDA, Naoki (RIKEN Nishina Center); FUKUSHIMA, Chihaya (Tokyo City University); FUKUTOME, Miki (Osaka University); KUSAKA, Kensuke (RIKEN Nishina Center); ICHINOHE, Yuto (RIKEN Nishina Center); ISHITANI, Soshi (Os-

aka University); ITO, Nao (Tokyo City University); KAGEYAMA, Rinon (Tokyo City Univeisity); KIKUCHI, Yuta (Saitama University); KITAGAWA, Naoyuki (Kyushu University); KOBAYASHI, Hayato (Univiersity of Tsukuba); MICHIMASA, Shin'ichiro (RIKEN Nishina Center); MIHARA, Mototsugu (Osaka University); MIKAWA, Misaki (University of Tsukuba); MITSUI, Maoto (University of Tsukuba); NAKAMURA, Yuki; NISHIZAWA, Satoru (Saitama University); OHTAKE, Masao (RIKEN Nishina Center); OHTSUBO, Takashi (Niigata Univ.); OZAWA, Akira (Univ. of Tsukuba); SASAMORI, Rena (Niigata University); SHIMAMURA, Toshiya (Niigata University); SHIMIZU, Yohei (RIKEN Nishina Center); SUZUKI, Hiroshi (RIKEN Nishina Center); TAKEDA, Hiroyuki (RIKEN Nishina Center); TAKIURA, Kazuki (Saitama University); TEZUKA, Koki (Niigata University); TOGANO, Yasuhiro (RIKEN Nishina Center); TOMIOKA, Nao (Saitama University); TSUJISAKA, Tasuku (Osaka University); WATANABE, Kohei (Saitama University); YAMAGUCHI, Takayuki (Saitama Univ.); YANAGISAWA, Yoshiyuki (RIKEN Nishina Center); YASUDA, Keigo (Osaka University); YOSHIMOTO, Masahiro (RIKEN Nishina Center); ZHANG, Hanbin (University of Tsukuba)

Presenter: INOUE, Chinami (Tokyo City University)

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