

Measurement of Interaction Cross Sections Near Stable Nuclei in TRIP-S3CAN/TRIP-S3CAN における 安定核近傍の相互作用断面積測定

Thursday, 20 November 2025 16:45 (1h 25m)

The interaction cross section (σ_I) is a fundamental observable that provides valuable information about the spatial extent of atomic nuclei and can be used to derive the nuclear matter radius. By determining nuclear radii, we can improve our understanding of nuclear structure and how nuclear size changes across the nuclear chart.

Traditionally, nuclear charge radii have been obtained from electron scattering and laser spectroscopy experiments. However, nuclear matter radii have not yet been widely determined from interaction cross sections over a wide range of mass numbers.

The TRIP-S3CAN experiment in 2025 at RIKEN's Radioactive Isotope Beam Factory (RIBF) aims to systematically investigate approximately 300 isotopes over a wide range of atomic numbers $Z = 25-60$. In this experiment, the magnetic rigidity (Bp), time of flight (TOF), and energy loss (ΔE) of the particles were measured to determine Z and mass-to-charge ratio (A/Q), and to identify the isotopes contained in the secondary beam. In this study, we determined the experimental interaction cross sections for nuclei near the line of stability. These results were compared with theoretical model predictions to clarify the structure of stable and near-stable nuclei and to elucidate nuclear reaction mechanisms more precisely.

Primary author: ENDO/遠藤, Shun/駿 (Tokyo City University/東京都市大学)

Co-authors: NISHIMURA/西村, Daiki/太樹 (Tokyo City University/東京都市大学); HE/何, Yi/熠 (Tokyo City University/東京都市大学); INOUE/井上, Chinami/千波 (Tokyo City University/東京都市大学); MATSUYAMA/松山, Kento/健斗 (Tokyo City University/東京都市大学); SATO/佐藤, Fubuki/風吹 (Tokyo City University/東京都市大学); MAEDA/前田, Keita/啓太 (Tokyo City University/東京都市大学); MORIGUCHI/森口, Tetsuaki/哲朗 (University of Tsukuba/筑波大学); TANAKA/田中, Masaomi/聖臣 (Kyushu University/九州大学); FUKUTOME/福留, Miki/美樹 (Niigata University/新潟大学); ISHITANI/石谷, Soushi/壮史 (The University of Osaka/大阪大学); TAGUCHI/田口, Ryo/諒 (The University of Osaka/大阪大学); TAKAYAMA/高山, Gen/元 (The University of Osaka/大阪大学); YANO/矢野, Asahi/朝陽 (University of Tsukuba/筑波大学); ADACHI/安達, Kazuhiro/主紘 (Niigata University/新潟大学); BABA/馬場, Hidetada/秀忠 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); FUKUDA/福田, Mitsunori/光順 (The University of Osaka/大阪大学); FUKUDA/福田, Naoki/直樹 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); ICHINOHE/一戸, Yuto/悠人 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); KAGEYAMA/影山, Rinon/璃音 (Tokyo City University/東京都市大学); KIKUCHI/菊池, Yuta/悠太 (Saitama University/埼玉大学); KOBAYASHI/小林, Nobuyuki/信之 (RCNP, The University of Osaka/大阪大学核物理研究センター); KOBAYASHI/小林, Hayato/颯人 (University of Tsukuba/筑波大学); KUSAKA/日下, Kensuke/健祐 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); MICHIMASA/道正, Shinichiro/新一郎 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); MIHARA 三原, Mototsugu/基嗣 (The University of Osaka/大阪大学); MIKAWA/三河, Misaki/美紗希 (University of Tsukuba/筑波大学); MITSUI/三井, Maoto/真音 (University of Tsukuba/筑波大学); NAGAE/長江, Daisuke/大輔 (Saitama University/埼玉大学); NISHIZAWA/西澤, Satoshi/悟 (Saitama University/埼玉大学); OHTAKE/大竹, Masao/政雄 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); OHTSUBO/大坪, Takashi/隆 (Niigata University/新潟大学); OZAWA/小沢, Akira/顕 (University of Tsukuba/筑波大学); SANTONASTASO, Claudio (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); SASAMORI/笹森, Rena/玲那 (Niigata University/新潟大学); SHIMAMURA/島村, Toshiya/敏矢 (Niigata University/新潟大学); SHIMIZU/清水, Yohei/陽平 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); SUZUKI/鈴木, Takeru/健 (Saitama University/埼玉大学); SUZUKI/鈴木, Hiroshi/宏 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); TAKEDA/竹田, Hiroyuki/浩之 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); TAKESHIGE/武重, Shoko/祥子 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); TEZUKA/手塚, Koki/康晃 (Niigata Uni-

versity/新潟大学); TOGANO/桐野, Yasuhiro/泰宏 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); WATANABE/渡辺, Kohei/晃平 (Saitama University/埼玉大学); WEI, Yu (Saitama University/埼玉大学); YAMAGUCHI/山口, Takayuki/貴之 (Saitama University/埼玉大学); YANAGISAWA/柳澤, Yoshiyuki/善行 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター); YASUDA/安田, Ibuki/伊吹 (Saitama University/埼玉大学); YASUDA/安田, Keigo/圭吾 (The University of Osaka/大阪大学); YOSHIMOTO/吉本, Masahiro/雅浩 (RIKEN Nishina Center/理化学研究所仁科加速器科学研究センター)

Presenter: ENDO/遠藤, Shun/駿 (Tokyo City University/東京都市大学)

Session Classification: Poster Session / ポスターセッション