

Research Facility Development Division
Research Instruments Group
Detector Team

1. Abstract

This team is in charge of maintenance and improvement of detectors which are used at BigRIPS separator and its succeeding beam lines for beam diagnosis and particle identification of RI beams. We are also engaged in R&D of new detectors that can be used for higher-intensity RI beams. In addition, we are doing the R&D which uses the pelletron accelerator together with other groups.

2. Major Research Subjects

Development, fabrication, and operation of beam-line detectors which are used for the production and delivery of RI beams (beam diagnosis and particle identification). R&D which uses the pelletron accelerator.

3. Summary of Research Activity

The current research subjects are summarized as follows:

- (1) Maintenance and improvement of the beam-line detectors which are used at BigRIPS separator and its succeeding beam lines
- (2) Development of new beam-line detectors with radiation hardness and tolerance for higher counting rates
- (3) Management of the pelletron accelerator and R&D which uses the pelletron

Members

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List of Publications & Presentations

Publications

[Original Papers]

- C. Y. Tsang, M. Kurata-Nishimura, M. B. Tsang, W. G. Lynch, Y. X. Zhange, J. Barney, J. Estee, G. Jhang, R. Wang, M. Kaneko, J. W. Lee, T. Isobe, T. Murakami, D. S. Ahn, L. Atar, T. Aumann, H. Baba, K. Boretzky, J. Brzychczyk, G. Cerizza, N. Chiga, N. Fukuda, I. Gasparic, B. Hong, A. Horvat, K. Ieki, N. Inabe, Y. J. Kim, T. Kobayashi, Y. Kondo, P. Lasko, H. S. Lee, Y. Leifels, J. Lukasik, J. Manfredi, A. B. McIntosh, P. Morfouace, T. Nakamura, N. Nakatsuka, S. Nishimura, H. Otsu, P. Pawlowski, K. Pelczar, D. Rossi, H. Sakurai, C. Santamaria, H. Sato, H. Scheit, R. Shane, Y. Shimizu, H. Simon, A. Snoch, A. Sochocka, T. Sumikama, H. Suzuki, D. Suzuki, H. Takeda, S. Tangwancharoen, H. Törnqvist, Y. Togano, Z. G. Xiao, S. J. Yennello, and Y. Zhang, π RIT collaboration, “Constraining nucleon effective masses with flow and stopping observables from the π RIT experiment,” *Phys. Lett. B* **853**, 138661 (2024).
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- Z. Elekes, V. Panin, T. R. Rodriguez, K. Sieja, D. S. Ahn, A. Al-Adili, H. Baba, A. I. Stefanescu, K. J. Cook, Cs. Dósa, N. Fukuda, J. Gao, J. Gibelin, K. I. Hahn, Z. Halász, S. W. Huang, T. Isobe, M. M. Juhász, D. Kim, T. Kobayashi, Y. Kondo, Z. Korkulu, A. Kurihara, I. Kuti, H. Miki, K. Miki, T. Motobayashi, H. Otsu, A. Saastamoinen, M. Sasano, H. Sato, N. H. Shadhin, T. Shimada, Y. Shimizu, I. C. Stefanescu, L. Stuhl, H. Suzuki, H. Takeda, Y. Togano, T. Tomai, L. Trache, D. Tudor, T. Uesaka, Y. Utsuki, H. Wang, A. Yasuda, K. Yoneda, and Y. Yoshitome, “Low-lying excited states in ^{62}Ge investigated by multinucleon knock-out reaction,” *J. Phys. G: Nucl. Part. Phys.* **51**, 105102 (2024).

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- N. Itoh, H. Allaire, T. Ikeda, S. Nagasawa, S. Okada, T. Takahashi, A. Takamine, Y. Toyama, Y. Uchida, and H. Ueno, "The energy dependence of cluster size and its physical processes in the proton measurement with TimePix3 silicon detector," *Nucl. Instrum. Methods Phys. Res. A* **1073**, 170244 (2025).

[Proceeding]

- G. Akamatsu, H. Tashima, S. Takyu, M. Yamaguchi, N. Kawachi, M. Sakai, J. Furukawa, S. Motomura, D. Kim, K. Shimazoe, S. Kurosawa, F. Nishikido, E. Yoshida, M. Takahashi, and T. Yamaya, "Proposal of performance evaluation methods for Compton cameras," *Proc. 2024 IEEE Nuclear Science Symposium, Medical Imaging Conference, and Room-Temperature Semiconductor Detectors Symposium*, 10.1109/NSS/MIC/RTSD57108.2024.10657442 (2024).

Presentations

[International Conferences/Workshops]

- M. Kurata-Nishimura (oral), "Development of liquid hydrogen target for large azimuthal acceptance," SAMURAI International Workshop 2024, Daejeon, Korea, July 14–16, 2024.
- M. Kurata-Nishimura (invited), *SrRIT* collaboration, "Current and future experiments at SAMURAI in RIBF RIKEN," NUSYM 2024, XIIth International Symposium on Nuclear Symmetry Energy, CAEN, France, September 9–14, 2024.
- G. Akamatsu (poster), H. Tashima, S. Takyu, M. Yamaguchi, N. Kawachi, M. Sakai, J. Furukawa, S. Motomura, D. Kim, K. Shimazoe, S. Kurosawa, F. Nishikido, E. Yoshida, M. Takahashi, and T. Yamaya, "Proposal of performance evaluation methods for Compton cameras," 2024 IEEE Nuclear Science Symposium, Medical Imaging Conference, and Room-Temperature Semiconductor Detectors Symposium, Tampa, USA, October 26–November 2, 2024.

[Domestic Conferences/Workshops]

- 池田時浩 (口頭発表), 内田佳那, 小島幸子, 佐藤広海, 「理化学研究所におけるタンデム加速器の現状 (2023 年度)」, 第 36 回「タンデム加速器及びその周辺技術の研究会」, 和光市 (理化学研究所), 2024 年 6 月 27–28 日.
- 小島幸子 (ポスター), 内田佳那, 池田時浩, 金衛国, 「キャピラリーによるイオンおよびレーザーのデュアル量子マイクロビーム細胞照射法の開発: 高次光回折リング径とパワー密度分布の評価」, 第 36 回「タンデム加速器及びその周辺技術の研究会」, 和光市 (理化学研究所), 2024 年 6 月 27–28 日.
- 池田時浩 (招待講演), 内田佳那, 小島幸子, 佐藤広海, 「理化学研究所タンデム加速器による MeV イオンマイクロビーム」, 日本マイクロビーム生物研究会シンポジウム「日本のマイクロビーム生物研究の四半世紀」, 敦賀市 (若狭湾エネルギー研究センター), 2024 年 7 月 26 日.
- 池田時浩 (口頭発表), 稲吉琴子, 小島幸子, 内田佳那, 金衛国, 「フタ付ガラスキャピラリーで生成された MeV イオンマイクロビームの半導体アレイ検出器によるプロファイル測定」, 第 67 回放射線化学討論会, 東広島市 (広島大学), 2024 年 9 月 6–7 日.
- 小島幸子 (口頭発表), 池田時浩, 内田佳那, 金衛国, 「ガラスキャピラリーによるレーザーマイクロビームのスポット構造の解析: 光輸送成分の波長依存性」, 第 67 回放射線化学討論会, 東広島市 (広島大学), 2024 年 9 月 6–7 日.
- 内田佳那 (口頭発表), 池田時浩, 小島幸子, 金衛国, 「ガラスキャピラリーによるレーザーマイクロビームのスポット構造の解析: フラウンホーファー回折様パターンの解析」, 第 67 回放射線化学討論会, 東広島市 (広島大学), 2024 年 9 月 6–7 日.
- 伊藤尚輝 (口頭発表), 外山裕一, 東俊行, 池田時浩, 長澤俊作, 岡田信二, 高橋忠幸, 高峰愛子, 上野秀樹, 「1.56 ns の時間分解能を持つ TimePix3 読み出しチップを搭載した Si ピクセル検出器の荷電粒子に対する検出性能の評価」, 日本物理学会第 79 回年次大会, 札幌市 (北海道大学), 2024 年 9 月 16–19 日.
- 池田時浩 (招待講演), 「理研におけるタンデム加速器及び ガラスキャピラリーマイクロビーム利用の現状」, 令和 7 年電気学会全国大会, 中野区 (明治大学), 2025 年 3 月 18–20 日.