

## C O N T E N T S

Page

## PREFACE

## PHENIX – looking at hot and cold nuclear matter and resurrecting itself again and again

## I. HIGHLIGHTS OF THE YEAR

Extension of the N=40 island of inversion to neutron-rich Cr and Fe isotopes ..... C. Santamaria <i>et al.</i>	1
Low-lying structure of $^{50}\text{Ar}$ and the $N = 32$ subshell closure ..... D. Steppenbeck <i>et al.</i>	2
Candidate resonant tetra-neutron state populated by the $^4\text{He}(^8\text{He}, ^8\text{Be})$ reaction ..... K. Kisamori <i>et al.</i>	3
Magnetic moment measurement of isomeric state in $^{75}\text{Cu}$ ..... Y. Ichikawa <i>et al.</i>	4
Deuteron Analyzing Powers for $d$ - $p$ elastic scattering at 190 MeV/nucleon and three-nucleon force effects ..... K. Sekiguchi <i>et al.</i>	5
Measurement of multiple isobar chains as a first step toward SHE identification via mass spectrometry ..... P. Schury, M. Wada, Y. Ito <i>et al.</i>	6
Gauge symmetry in the large-amplitude collective motion of superfluid nuclei ..... K. Sato	7
Cross section measurement for the spallation reaction of long-lived fission products ..... H. Wang, H. Otsu <i>et al.</i>	8
Final results of $A_{LL}^{\pi^0}$ measurement at $\sqrt{s} = 510$ GeV at mid-rapidity through a PHENIX experiment ..... I. Yoon	9
$A_N$ of forward neutron production in $\sqrt{s} = 200$ GeV polarized proton-nucleus collisions in the PHENIX experiment ..... M. Kim <i>et al.</i>	10
Search for the deeply bound $K^-pp$ state from the semi-inclusive forward-neutron spectrum in the in-flight $K^-$ reaction on helium-3 ..... T. Hashimoto <i>et al.</i>	11
Phase-space distributions in QGP and thermal photons ..... A. Monnai	12
$\Lambda_b \rightarrow p \ell^- \bar{\nu}_\ell$ and $\Lambda_b \rightarrow \Lambda_c \ell^- \bar{\nu}_\ell$ form factors from lattice QCD with relativistic heavy quarks ..... S. Meinel <i>et al.</i>	13
Development of carbon disk at the final stripping section ..... H. Hasebe <i>et al.</i>	14
Development of Particle identification method of high-intensity secondary beams at BigRIPS ..... S. Ota <i>et al.</i>	15
The first on-line commissioning study on parasitic production of low-energy RI-beam system(PALIS) at BigRIPS ..... T. Sonoda <i>et al.</i>	16
NeuLAND demonstrator at SAMURAI: commissioning and efficiency studies ..... J. Kahlbow <i>et al.</i>	17
Beam commissioning of the rare-RI ring ..... Y. Yamaguchi <i>et al.</i>	18
Measurement of isochronism using $^{78}\text{Kr}$ beam for the Rare RI Ring ..... Y. Abe <i>et al.</i>	19
Possible muonic radical formation in cytochrome $c$ ..... Y. Sugawara <i>et al.</i>	20
Development of a rapid solvent extraction apparatus for the aqueous chemistry of the heaviest elements ..... Y. Komori <i>et al.</i>	21
Production of $^{67}\text{Cu}$ using the $^{70}\text{Zn}(d,an)^{67}\text{Cu}$ reaction ..... S. Yano <i>et al.</i>	22

Characteristics of genomic rearrangements induced by heavy-ion beam irradiation in <i>Arabidopsis thaliana</i> .....	23
T. Hirano <i>et al.</i>	
Breeding of Summer-Autumn Flowering Chrysanthemum cv. Hakuryo with a little generation of malformed flower .....	24
A. Hisamura <i>et al.</i>	

## II. RESEARCH ACTIVITIES I (Nuclear, Particle and Astro-Physics)

### 1. Nuclear Physics

Decay properties of $^{68,69,70}\text{Mn}$ .....	25
G. Benzoni, A.I. Morales	
Excited states of $^{136-138}\text{Sb}$ from $\beta$ decay .....	26
J. Keatings, G. Simpson <i>et al.</i>	
$T_z = -1$ and $T_z = -2$ $\beta$ -decay studies using $^{78}\text{Kr}$ fragmented beams at BigRIPS, part I .....	27
B. Rubio <i>et al.</i>	
$T_z = -1$ and $T_z = -2$ $\beta$ -decay studies using $^{78}\text{Kr}$ fragmented beams at BigRIPS, part II .....	28
B. Rubio <i>et al.</i>	
Isospin symmetry studies beyond the $f_{7/2}$ shell: study of the beta decay of $^{70,71}\text{Kr}$ .....	29
A. Algora <i>et al.</i>	
Discovery of a $\mu\text{s}$ isomer of $^{76}\text{Co}$ .....	30
P-A Söderström <i>et al.</i>	
Determination of $Q_\beta$ for the Gamow-Teller decay of $^{100}\text{Sn}$ and $^{98}\text{Cd}$ .....	31
D. Lubos and J. Park	
Investigation of octupole correlations of neutron-rich $Z \sim 56$ isotopes by $\beta$ - $\gamma$ spectroscopy .....	32
R. Yokoyama <i>et al.</i>	
Study of neutron-rich $^{142}\text{Xe}$ using $\beta$ -decay spectroscopy .....	33
A. Yagi <i>et al.</i>	
New neutron-deficient isotopes from $^{78}\text{Kr}$ fragmentation .....	34
B. Blank <i>et al.</i>	
Second campaign of the SEASTAR project .....	35
P. Doornenbal <i>et al.</i>	
Intermediate-energy Coulomb excitation of $^{77}\text{Cu}$ .....	36
E. Sahin <i>et al.</i>	
Coulomb excitation of $^{136}\text{Te}$ studied with the DALI2 spectrometer .....	37
V. Vaquero <i>et al.</i>	
Experimental study of isoscalar and isovector dipole resonances in neutron-rich oxygen isotopes .....	38
N. Nakatsuka <i>et al.</i>	
Study of the pygmy dipole resonance of $^{132}\text{Sn}$ and $^{128}\text{Sn}$ in inelastic $\alpha$ -scattering .....	39
J. Tscheuschner and T. Aumann	
E1 strength around threshold in $^{70}\text{Ni}$ .....	40
R. Avigo and O. Wieland	
In-beam $\gamma$ -ray spectroscopy of $^{55}\text{Sc}$ .....	41
D. Steppenbeck <i>et al.</i>	
Spectroscopy of unbound oxygen isotopes II .....	42
Y. Kondo <i>et al.</i>	
First commissioning results for $\text{S}\pi\text{RIT-TPC}$ .....	43
M. Kurata-Nishimura <i>et al.</i>	
Study on neutron-neutron correlation in Borromean nuclei via the $(p, pn)$ reaction with the SAMURAI spectrometer .....	44
Y. Kubota <i>et al.</i>	
Study of Gamow-Teller transition from $^{132}\text{Sn}$ via the $(p, n)$ reaction in inverse kinematics .....	45
J. Yasuda <i>et al.</i>	
Progress report of Gamow-Teller giant resonance studies at RIBF .....	46
M. Sasano <i>et al.</i>	
Interaction cross section measurement of neutron-rich nuclei: $^{17,19}\text{B}$ .....	47
A. T. Saito <i>et al.</i>	

Time-of-Flight mass measurements of neutron-rich Ca isotopes beyond $N = 34$ .....	48
M. Kobayashi <i>et al.</i>	
Isomer spectroscopy of neutron-rich nuclei near $N = 40$ .....	49
Y. Kiyokawa <i>et al.</i>	
The ( $^{16}\text{O}, ^{16}\text{F}(0^-)$ ) reaction to study spin-dipole $0^-$ states .....	50
M. Dozono <i>et al.</i>	
Spectroscopy of single-particle states in oxygen isotopes via the $^4\text{O}(p, 2p)$ reaction .....	51
S. Kawase <i>et al.</i>	
Spectroscopic factors of the proton bound states in $^{23,25}\text{F}$ .....	52
T.L. Tang <i>et al.</i>	
Spin-dipole response of $^4\text{He}$ by exothermic charge exchange ( $^8\text{He}, ^8\text{Li}^*(1^+)$ ) .....	53
H. Miya <i>et al.</i>	
Magnetic moment measurement of isomeric state in $^{99}\text{Zr}$ and characterization of the abrasion-fission mechanism .....	54
F. Boulay, J.M. Daugas <i>et al.</i>	
First dedicated in-beam X-ray measurement at GARIS .....	55
C. Berner	
Isotope identification in nuclear emulsion plate for double-hypernuclear study .....	56
S. Kinbara <i>et al.</i>	
Measurement of nuclear magnetic moment of neutron-rich $^{39}\text{S}$ .....	57
Y. Ishibashi <i>et al.</i>	
Polarization measurements of $^{39}\text{S}$ for $\beta$ -NMR studies .....	58
A. Gladkov <i>et al.</i>	
$\beta$ -NMR measurement in coincidence with $\beta$ -delayed $\gamma$ rays of $^{39}\text{S}$ .....	59
L.C. Tao <i>et al.</i>	
First application of the Trojan Horse Method with a radioactive ion beam: study of the $^{18}\text{F}(p, \alpha)^{15}\text{O}$ reaction at astrophysical energies .....	60
S. Cherubini <i>et al.</i>	
Different mechanism of two-proton emission from excited states of proton-rich nuclei $^{23}\text{Al}$ and $^{22}\text{Mg}$ .....	61
Y.G. Ma <i>et al.</i>	
Observation of resonances in $^{14}\text{C}$ with $^{10}\text{Be} + \alpha$ resonant elastic scattering at CRIB .....	62
H. Yamaguchi <i>et al.</i>	
New Trojan Horse study of the $^{18}\text{F}(p, \alpha)^{15}\text{O}$ reaction at astrophysical energies .....	63
S. Cherubini <i>et al.</i>	
$^{17}\text{F}$ elastic scattering and total reaction cross section on $^{58}\text{Ni}$ target around Coulomb barrier .....	64
C.J. Lin, N.R. Ma <i>et al.</i>	
Measurement of alpha elastic scattering on $^{15}\text{O}$ .....	65
A. Kim <i>et al.</i>	
RI beam production at BigRIPS in 2015 .....	66
Y. Shimizu <i>et al.</i>	
Production cross section measurement for radioactive isotopes produced from $^{78}\text{Kr}$ beam at 345 MeV/nucleon by BigRIPS separator .....	68
H. Suzuki <i>et al.</i>	
Production cross-section measurements for the systematics of Na and Mg isotopes with $^{48}\text{Ca}$ beam .....	69
D.S. Ahn <i>et al.</i>	
RI-beam production using BigRIPS separator in regions heavier than those belonging to lead isotope .....	70
T. Sumikama <i>et al.</i>	
Development of a slowed-down beam of $^{82}\text{Ge}$ at RIBF .....	71
T. Sumikama <i>et al.</i>	
Target study for magnetic moment measurement of $^{40}\text{Sc}$ .....	72
Y. Ishibashi <i>et al.</i>	
Giant dipole resonance built on hot rotating nuclei produced during evaporation of light particles from the $^{88}\text{Mo}$ compound nucleus .....	73
M. Ciemala <i>et al.</i>	

Experimental investigation on the temperature dependence of the nuclear level density parameter B. Dey <i>et al.</i>	74
<b>2. Nuclear Physics (Theory)</b>	
Impurity effects of the $\Lambda$ particle on the $2\alpha$ cluster states of ${}^9\text{Be}$ and ${}^{10}\text{Be}$ M. Isaka and M. Kimura	75
Excited states above the Hoyle state Y. Funaki	76
Shell-model fits for $N = 82$ isotones M. Honma <i>et al.</i>	77
Soft negative-parity excitations of rotating super- and hyperdeformed states around ${}^{40}\text{Ca}$ studied by Skyrme-RPA calculations M. Yamagami and K. Matsuyanagi	78
Pairing Reentrance in warm rotating ${}^{104}\text{Pd}$ nucleus N. Quang Hung <i>et al.</i>	79
Effects of thermal shape fluctuations and pairing fluctuations on the giant dipole resonance in warm nuclei A.K. Rhine Kumar <i>et al.</i>	80
Stability of the wobbling motion in an odd-A nucleus K. Tanabe, K. Sugawara-Tanabe	81
Constraints on the neutron skin and the symmetry energy from the anti-analog giant dipole resonance in ${}^{208}\text{Pb}$ Cao, Roca-Maza, Colo and Sagawa	82
Variational study of the equation of state for neutron star matter with hyperons H. Togashi <i>et al.</i>	83
Joint project for large-scale nuclear structure calculations in 2015 N. Shimizu <i>et al.</i>	84
<b>3. Nuclear Data</b>	
Measurements of secondary neutrons produced from thin Be and C by 50 MeV/u ${}^{238}\text{U}$ beam H.S. Lee <i>et al.</i>	85
Coulomb breakup reactions of long-lived fission products, ${}^{79}\text{Se}$ , ${}^{93}\text{Zr}$ , and ${}^{107}\text{Pd}$ S. Takeuchi <i>et al.</i>	86
Cross section measurement of residues in proton- and deuteron-induced spallation reactions of ${}^{93}\text{Zr}$ and ${}^{93}\text{Nb}$ S. Kawase <i>et al.</i>	87
Simulation of thick-target transmission method for interaction cross sections of ${}^{93}\text{Zr}$ on ${}^{12}\text{C}$ M. Aikawa <i>et al.</i>	88
Nuclear data study for the development of transmutation technology S. Ebata <i>et al.</i>	89
Compilation of nuclear reaction data from the RIBF in 2015 D. Ichinkhorloo <i>et al.</i>	90
New EXFOR editor: a review of recent developments A. Sarsembayeva <i>et al.</i>	91
<b>4. Hadron Physics</b>	
Determination of the detector acceptance correction for the PHENIX $W \rightarrow \mu$ analysis S. Park	93
Overall trigger efficiency estimation for $W$ analysis at PHENIX Sangwha Park and Ralf Seidl	94
Status of longitudinal double helicity asymmetries ( $A_{LL}$ ) in $\pi^\pm$ productions in $\sqrt{s} = 510$ GeV polarized $p + p$ collisions in RHIC-PHENIX experiment T. Moon <i>et al.</i>	95
Quality assurance of PHENIX spin database for Run 15 at RHIC S. Karthas <i>et al.</i>	96
Gain calibration of the PHENIX Shower Max Detector (SMD) J. Yoo <i>et al.</i>	97

Measurement of transverse single spin asymmetry for $J/\psi$ production in polarized p+p and p+Au collisions at PHENIX ...	98
C. Xu, H. Yu and X. Wang	
Studies on transverse spin properties of nucleons at PHENIX .....	99
Y. Goto	
Investigation of prompt photon asymmetries using the MPC-EX detector at Brookhaven National Laboratory .....	100
D. Kapukchyan	
Analysis of displaced electron tracks with the silicon vertex tracker in Au+Au collisions $\sqrt{s_{NN}} = 200$ GeV at RHIC-PHENIX .....	101
H. Asano <i>et al.</i>	
Current status of open heavy flavor measurements in RHIC-PHENIX RUN14 .....	102
K. Nagashima <i>et al.</i>	
Single electron yields from semileptonic charm and bottom hadron decays in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV .....	103
T. Hachiya <i>et al.</i>	
Measurements of directed, elliptic, and triangular flow in Cu+Au collisions at $\sqrt{s_{NN}} = 200$ GeV .....	104
H. Nakagomi for the PHENIX	
Searching for mini-QGP in p+p collisions using a high multiplicity trigger with the FVTX .....	105
S. Han <i>et al.</i>	
Silicon tracker for sPHENIX .....	106
I. Nakagawa <i>et al.</i>	
Forward Jet asymmetry measurements in fsPHENIX .....	107
R. Seidl and A. Vossen	
Towards measurement of direct photons via external conversions in high multiplicity pp collisions at 13 TeV .....	108
H. Murakami	
Neutral pion production in pp collisions at LHC energies .....	109
Satoshi Yano	
Long-range correlation of $V^0$ particles in p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with the ALICE detector .....	110
Y. Sekiguchi	
Search for exotic dibaryons at LHC-ALICE .....	111
K. Terasaki <i>et al.</i>	
RHICf experiment to measure cross section and asymmetry in very forward neutral particle production at RHIC .....	112
T. Sako <i>et al.</i>	
Fragmentation function measurements in Belle .....	113
R. Seidl <i>et al.</i>	
Progress of Drell–Yan experiment by SeaQuest at Fermilab .....	114
K. Nagai <i>et al.</i>	
<b>5. Hadron Physics (Theory)</b>	
P-odd spectral density of quark-gluon plasma at weak coupling .....	115
H.-U. Yee	
Legendre expansion of longitudinal two-particle correlations .....	116
A. Monnai and B. Schenke	
Constraining shear viscosity of QCD matter at forward rapidity .....	117
G. Denicol <i>et al.</i>	
Axial current generation by P-odd domain in QCD matter .....	118
I. Iatrakis, S. Lin and Y. Yin	
Anomalous chiral effects in heavy ion collisions .....	119
JINFENG LIAO	
Transverse momentum dependent jet model for quark fragmentation functions .....	120
W. Bentz and K. Yazaki	
Perturbative matching for quasi-PDFs between continuum and lattice .....	121
T. Ishikawa	
Chiral contamination in nucleon correlation functions .....	122
B.C. Tiburzi	

High-precision calculation of the strange nucleon electromagnetic form factors ..... J. Green, S. Meinel <i>et al.</i>	123
<b>6. Particle Physics</b>	
Lattice determination of $ V_{us} $ with inclusive hadronic $\tau$ decay experiment ..... T. Izubuchi and H. Ohki	125
Standard-model prediction for direct CP violation in $K \rightarrow \pi\pi$ decays ..... C. Kelly	126
Dipolar quantization and the infinite circumference limit of 2d CFT ..... T. Tada	127
Revision of the brick wall method for calculating the black hole thermodynamic quantities ..... F. Lenz, K. Ohta and K. Yazaki	128
Direct detection of composite dark matter via electromagnetic polarizability ..... E.T. Neil <i>et al.</i>	129
<b>7. Astrophysics and Astro-Glaciology</b>	
Diagnose oscillation properties observed in an annual ice-core oxygen isotope record obtained from Dronning Maud Land, Antarctica ..... Y. Hasebe <i>et al.</i>	131
Box-model simulation for variation of atmospheric chemical composition caused by solar energetic particles ..... Y. Nakai <i>et al.</i>	132
Overview of the chemical composition and characteristics of $\text{Na}^+$ and $\text{Cl}^-$ distributions in samples from Antarctic ice core DF01 (Dome Fuji) drilled in 2001 ..... Y. Motizuki <i>et al.</i>	133
<b>8. Accelerator</b>	
Energy upgrade for biological applications ..... N. Fukunishi <i>et al.</i>	135
Installation of changeover switches for dipole and quadrupole magnet on a new beam transport line ..... K. Kumagai <i>et al.</i>	136
Progress in high-temperature-oven development for 28 GHz ECR ion source ..... J. Ohnishi <i>et al.</i>	137
Search for suitable scintillation materials for the pepper-pot type emittance meter for diagnostics of low-energy heavy ion beams from an ECR ion source ..... T. Nagatomo <i>et al.</i>	138
Design of input coupler for RIKEN superconducting quarter-wavelength resonator ..... K. Ozeki <i>et al.</i>	139
Study of plasma window for larger aperture ..... N. Ikoma <i>et al.</i>	140
Plasma spectroscopy for ECR ion source tuning at RIKEN ..... H. Muto <i>et al.</i>	141
Status of cryopumps in accelerator facilities ..... Y. Watanabe <i>et al.</i>	142
Nishina RIBF water-cooling system ..... T. Maie <i>et al.</i>	143
Development of pepper-pot emittance monitor for AVF cyclotron ..... Y. Kotaka <i>et al.</i>	144
HTc-SQUID beam current monitor at the RIBF ..... T. Watanabe <i>et al.</i>	145
Radiation monitoring in the RIBF using ionization chamber ..... M. Nakamura <i>et al.</i>	146
Improvement of the RIBF control system ..... M. Komiyama <i>et al.</i>	147
Control system renewal for efficient operation of RIKEN 18 GHz electron cyclotron resonance ion source ..... A. Uchiyama <i>et al.</i>	148

EPICS PV management and method for RIBF control system .....	149
A. Uchiyama <i>et al.</i>	
New operation interface for rf voltage and phase of RIBF cyclotrons using rotary encoder .....	150
K. Yamada <i>et al.</i>	
Development of a buffer gas-free Buncher for SCRIT experiments .....	151
K. Yamada <i>et al.</i>	
Lithium ion production for laser ion source .....	152
M. Okamura <i>et al.</i>	
Response of an axial magnetic field to injection of laser ablation plasma .....	153
S. Ikeda <i>et al.</i>	
Performance of a fast kicker magnet for Rare-RI Ring .....	154
H. Miura <i>et al.</i>	
<b>9. Instrumentation</b>	
Ion-optical study of additive and subtractive modes of BigRIPS .....	155
H. Takeda <i>et al.</i>	
PPAC high-rate study with $Z \sim 50$ beams (MS-EXP15-09) .....	156
H. Sato <i>et al.</i>	
ANSYS code calculations for measuring beam spot temperature .....	157
Z. Korkulu <i>et al.</i>	
Measurement of beam-spot temperature on production target at BigRIPS .....	158
Y. Yanagisawa <i>et al.</i>	
Temperature measurements of the high power beam dump of the BigRIPS separator .....	159
K. Yoshida <i>et al.</i>	
Production of low-energy 4.17 MeV/nucleon $^9\text{C}$ beam with polyethylene degrader at RIPS .....	160
E. Milman <i>et al.</i>	
SpiRITROOT: an analysis framework for the S $\pi$ RIT experiment .....	161
G. Jhang <i>et al.</i>	
Construction of readout system for SPiRIT-TPC .....	162
T. Isobe <i>et al.</i>	
Multiplicity trigger array for the S $\pi$ RIT experiment .....	163
M. Kaneko <i>et al.</i>	
Performance test of the silicon tracker for the heavy-ion-proton experiments at SAMURAI .....	164
V. Panin <i>et al.</i>	
Development for proton detector NINJA at SAMURAI magnet gap with VME-EASIROC readout .....	165
N. Chiga <i>et al.</i>	
Frame design for the $\gamma$ -ray detector array CATANA .....	166
N. Chiga <i>et al.</i>	
Status of the ( $p, 2p$ ) silicon tracker for upcoming fission experiments with the SAMURAI spectrometer .....	167
S. Reichert, M. Sako <i>et al.</i>	
Development of the He-filling system for the SAMURAI spectrometer .....	168
V. Panin <i>et al.</i>	
Beta-delayed neutron measurement with new detector NiGIRI .....	169
V. H. Phong <i>et al.</i>	
Low-pressure MWDC system for ESPRI experiment (II) .....	170
Y. Matsuda <i>et al.</i>	
Development of a new low-energy neutron detector with pulse shape discrimination properties for (p,n) experiments .....	171
L. Stuhl <i>et al.</i>	
Hyperpolarization of flowing water by dynamic nuclear polarization .....	172
K. Yamada <i>et al.</i>	
Design study of triplet-resonance circuit to polarize $^{13}\text{C}$ spins utilizing dynamic nuclear polarization and cross polarization .....	173
T. Kaneko, K. Tateishi and T. Uesaka	

Dependence of spin-polarized proton target performance on microwave resonator thickness parameter and operation temperature .....	174
S. Chebotaryov <i>et al.</i>	
Pressure dependence of effective gas gain of THGEM in deuterium gas .....	175
C.S. Lee <i>et al.</i>	
Development of $^{178m2}\text{Hf}$ isomer target .....	176
N. Kitamura <i>et al.</i>	
Construction of OEDO beamline .....	177
S. Michimasa <i>et al.</i>	
Simulation study of a new energy-degrading beamline, OEDO .....	178
M. Matsushita <i>et al.</i>	
Performance of a resonant Schottky pick-up in the commissioning of Rare RI Ring .....	179
F. Suzuki <i>et al.</i>	
Online results for the injection ion optics of the Rare RI Ring .....	180
Z. Ge <i>et al.</i>	
Circulation detector for Rare RI Ring .....	181
D. Nagae	
Study on background suppression of charged particles using GARIS-II filled with He-H <sub>2</sub> mixture .....	182
D. Kaji <i>et al.</i>	
Current status of a gas-cell system for precision experiments with GARIS-II .....	183
Y. Ito <i>et al.</i>	
Extraction of multi-nucleon transfer reaction products in the $^{136}\text{Xe}$ and $^{198}\text{Pt}$ system .....	184
Y. Hirayama <i>et al.</i>	
Measuring luminosity of electron scattering from Xe isotopes at the SCRIT experiment .....	185
A. Enokizono <i>et al.</i>	
Current status of RI beam production at electron-beam-driven RI separator for SCRIT (ERIS) .....	186
T. Ohnishi <i>et al.</i>	
Commissioning of SCRIT electron scattering facility with stable nuclear targets .....	187
K. Tsukada <i>et al.</i>	
New design of timing-controller circuit board for accelerators in the SCRIT facility .....	188
M. Watanabe <i>et al.</i>	
All-solid-state continuous-wave laser source at 313 nm for laser cooling of Be <sup>+</sup> ions .....	189
A. Takamine <i>et al.</i>	
An injection-locked Titanium:Sapphire laser for high-resolution in-jet resonance ionization spectroscopy at PALIS .....	190
M. Reponen <i>et al.</i>	
Development of magnetic field coils for laser spectroscopy of atoms in He II .....	191
T. Fujita <i>et al.</i>	
Intensity evaluation of laser-RF double resonance signal of Rb atoms in superfluid helium cryostat .....	192
K. Imamura <i>et al.</i>	
Formation of uniform heavy-ion beam for industrial utilization .....	193
T. Kambara and A. Yoshida	
Gamma-ray inspection of rotating object .....	194
T. Kambara <i>et al.</i>	
Development of a new cluster reconstruction method for GEM Tracker for the J-PARC E16 experiment .....	195
W. Nakai <i>et al.</i>	
Study of the effect of radiation damage on the quantum efficiency of a CsI photocathode .....	196
K. Kanno	
Performance of the FVTX high-multiplicity trigger system for the RHIC-PHENIX experiment Run15 .....	197
T. Nagashima <i>et al.</i>	
R&D of silicon strip detector for the sPHENIX tracker .....	198
G. Mitsuka <i>et al.</i>	
Development of sensor prototype for sPHENIX Silicon Tracker .....	199
Y. Akiba <i>et al.</i>	



Implementation of the TDC function in the GTO .....	200
T. Yoshida <i>et al.</i>	
New functions in Generic Trigger Operator .....	201
H. Baba <i>et al.</i>	
Upgrade of trigger circuits and DAQ modules for SAMURAI .....	202
Y. Togano <i>et al.</i>	
Tests of the Advanced Implantation Detector Array (AIDA) at RIBF .....	203
C. Griffin, T. Davinson <i>et al.</i>	
CCJ operations in 2015 .....	204
S. Yokkaichi <i>et al.</i>	
Computing and network environment at the RIKEN Nishina Center .....	205
T. Ichihara <i>et al.</i>	

### III. RESEARCH ACTIVITIES II (Material Science and Biology)

#### 1. Atomic and Solid State Physics (Ion)

Site change of hydrogen owing to lattice distortion in Nb alloys .....	207
C. Sugi <i>et al.</i>	
Superconducting proximity effects in Nb/rare-earth bilayers .....	208
H. Yamazaki	
Evaluation of single event transient error rate related to operation frequency on 64bit SOI micro processor .....	209
A. Maru <i>et al.</i>	

#### 2. Atomic and Solid State Physics (Muon)

$\mu$ SR study of the Cu-spin correlation in heavily electron-doped high- $T_c$ $T'$ -cuprates .....	211
T. Adachi <i>et al.</i>	
Magnetic ordering in $\text{YBa}_2\text{Cu}_3\text{O}_6$ .....	212
S.S. Mohd-Tajudin	
$\mu$ SR study of an insulator near high- $T_c$ honeycomb lattice superconductors .....	213
S. Shamoto and I. Watanabe	
Investigation of magnetic ground states in mixed kagome systems $(\text{Rb}_{1-x}\text{Cs}_x)_2\text{Cu}_3\text{SnF}_{12}$ II .....	214
T. Suzuki <i>et al.</i>	
$\mu$ SR Result on Magnetic ground state of $\text{Ce}_{1-x}\text{La}_x\text{T}_2\text{Al}_{10}$ ( $T = \text{Ru, Os}$ ) .....	215
N. Adam <i>et al.</i>	
$\mu$ SR study on the Kondo semiconductor $(\text{Ce}_x\text{La}_{1-x})\text{Ru}_2\text{Al}_{10}$ .....	216
N. Adam <i>et al.</i>	
Disappearing of the Ir-ordered state in the Pyrochlore iridates $(\text{Nd,Ca})_2\text{Ir}_2\text{O}_7$ studied by $\mu$ SR .....	217
R. Asih <i>et al.</i>	
$\mu$ SR investigation of novel magnetism in the 4d Heisenberg-Kitaev honeycomb compound $\alpha\text{-RuCl}_3$ .....	218
Sungwon Yoon <i>et al.</i>	
Investigation of the magnetic ground state of frustrated spin system $\text{Rb}_2\text{Cu}_2\text{Mo}_3\text{O}_{12}$ .....	219
S. Ohira-Kawamura <i>et al.</i>	
Spin dynamics for p electrons in $\text{CsO}_2$ and $\text{NaO}_2$ .....	220
D.P. Sari <i>et al.</i>	
$\mu$ SR study of spin dynamics in Cu-based organic-inorganic hybrid systems .....	221
E. Suprayoga <i>et al.</i>	
Study of frustrated antiferromagnetic states by $\mu$ SR .....	222
M. Abdel-Jawad <i>et al.</i>	
Antiferromagnetic ordering in organic $\pi - d$ hybrids $[\text{Pd}(\text{tmdt})_2]$ .....	223
R. Takagi <i>et al.</i>	
Solute-vacancy clustering in Al-Mg-Si and Al-Si alloys .....	224
K. Nishimura <i>et al.</i>	
Li-ion diffusion in Li-ion battery material $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4$ .....	225
I. Umegaki <i>et al.</i>	

Development of RF cavity for MuSEUM experiment in a zero magnetic field K.S. Tanaka	226
Development of magnetic shield for the MuSEUM experiment S. Kanda	227
Ultra-slow muon production at the RIKEN-RAL muon facility based on muonium emission from silica aerogel S. Okada <i>et al.</i>	228
Development of a slow muon detection system for a muon acceleration R. Kitamura	229
FAMU experiment: studies on the muon transfer process in a mixture of hydrogen and higher Z gas A. Vacchi <i>et al.</i>	230
Development of mid-infrared laser for the measurement of muonic hydrogen atom hyperfine splitting energy S. Aikawa <i>et al.</i>	231
<b>3. Radiochemistry and Nuclear Chemistry</b>	
Production of neutron deficient Rf isotopes in $^{208}\text{Pb} + ^{48,50}\text{Ti}$ reactions S. Goto <i>et al.</i>	233
Off-line experiments of isothermal gas chromatography for Zr and Hf tetrachlorides K. Shirai <i>et al.</i>	234
Adsorption behavior of No with a TTA chelate extractant from HF/HNO <sub>3</sub> acidic solutions Y. Fukuda <i>et al.</i>	235
Extraction behavior of Mo and W from sulfuric acid into Aliquat336 as model experiments for seaborgium (Sg) A. Mitsukai <i>et al.</i>	236
Solid-liquid extraction of Nb and Ta with Aliquat 336 resin from HF solutions for chemical experiment of element 105, Db D. Sato <i>et al.</i>	237
Extraction behaviors of chloride complexes of Nb and Ta with triisooctyl amine for chemical experiment of dubnium (Db) R. Motoyama <i>et al.</i>	238
Development of an automated batch-type solid-liquid extraction apparatus and extraction of Zr, Hf, and Th by triisooctylamine from HCl solutions for chemistry of element 104, Rf Y. Kasamatsu <i>et al.</i>	239
Solvent extraction of Zr and Hf using the online flow-type extraction apparatus for superheavy elements Y. Kasamatsu <i>et al.</i>	240
Solvent extraction behavior of Zr and Hf with di(2-ethylhexyl)phosphoric acid for aqueous chemistry of Rf R. Yamada <i>et al.</i>	241
$^{99}\text{Ru}$ Mössbauer spectroscopy of Na-ion batteries of Na <sub>2</sub> RuO <sub>3</sub> (II) K. Takahashi <i>et al.</i>	242
Quantitative study on metallofullerene separation by chemical reduction K. Akiyama <i>et al.</i>	243
Production cross sections of ( <i>d,x</i> ) reactions on natural platinum M.U. Khandaker and H. Haba	244
Measurement of production cross sections of Re isotopes in the $^{nat}\text{W}(d,x)$ reactions Y. Komori <i>et al.</i>	245
Alpha particle induced cross section measurements on natural and enriched Cd at 50 MeV F. Ditrói, S. Takács and H. Haba	246
Excitation function of $\alpha$ -induced reaction on $^{nat}\text{Pd}$ for $^{103}\text{Ag}$ production M. Aikawa <i>et al.</i>	247
Excitation functions of deuteron-induced reactions on natural nickel AR Usman, MU Khandaker and H. Haba	248
Cross checking of monitor reactions at RIKEN AVF cyclotron using 50 MeV alpha particle beams S. Takács <i>et al.</i>	249

#### 4. Radiation Chemistry and Biology

The defect of non-homologous end joining substantially enhanced the focus formation of Rad51 after X-ray irradiation, but not after heavy-ion irradiation .....	251
M. Izumi and T. Abe	
Low-dose high-LET heavy ion-induced bystander signaling (II) .....	252
M. Tomita <i>et al.</i>	
Effects of several LET conditions on the mutation isolation system in fruit flies .....	253
K. Tsuneizumi and T. Abe	
Development of a high-performance bioinformatics pipeline for rice exome sequencing .....	254
H. Ichida <i>et al.</i>	
Molecular characterization of mutations induced in <i>PLASTOCHRON2</i> by a heavy-ion beam in dry rice seeds .....	255
R. Morita <i>et al.</i>	
Effect of Ar-ion beam irradiation on imbibed seed of rice .....	256
Y. Hayashi <i>et al.</i>	
Relationship between early-flowering mutation and LET-Gy combination of ion beam irradiation in einkorn wheat .....	257
K. Murai <i>et al.</i>	
Improvement of DelMapper: software for deletion mapping of non-recombining region .....	258
K. Ishii <i>et al.</i>	
A new physical mapping of the <i>Silene latifolia</i> Y chromosome .....	259
Y. Kazama <i>et al.</i>	
Sexual reproduction observed in the loss-of-apomixis mutants of guineagrass induced by heavy-ion beam irradiation .....	260
M. Takahara <i>et al.</i>	
Induction of flower color mutants by heavy-ion irradiation to leaf blades of spray-mum ‘Southern Chelsea’ .....	261
Y. Tanokashira <i>et al.</i>	
Production of mutant line with early flowering at a low temperature in spray-type chrysanthemum cultivar induced by C-ion beam irradiation .....	262
K. Sakamoto <i>et al.</i>	
Agronomic characteristics of new edible chrysanthemum cultivar ‘Yamaen K4’ induced by heavy-ion beam irradiation .....	263
S. Endo <i>et al.</i>	
Isolation of dwarf mutants induced with C-ion beam irradiation in pea cultivar ‘Kishu-usui’ .....	264
Y. Kotani <i>et al.</i>	
Robust strains isolated by heavy-ion beam irradiation and endurance screening in the green algae, <i>Haematococcus pluvialis</i> .....	265
T. Takeshita <i>et al.</i>	
Particle beam radiation of the ectomycorrhizal basidiomycete <i>Tricholoma matsutake</i> that produces the prized, but uncultivable, mushroom ‘matsutake’ .....	266
H. Murata <i>et al.</i>	
Microbeam divergence from glass capillaries compared with simulation for biological use .....	267
T. Ikeda <i>et al.</i>	

#### IV. OPERATION RECORDS

Program Advisory Committee meetings for nuclear physics and for materials and life experiments .....	269
K. Yoneda <i>et al.</i>	
Beam-time statistics of RIBF experiments .....	270
K. Yoneda <i>et al.</i>	
Electric power condition of Wako campus in 2015 .....	271
E. Ikezawa <i>et al.</i>	
Radiation safety management at RIBF .....	272
Kanenobu Tanaka <i>et al.</i>	
RILAC operation .....	274
E. Ikezawa <i>et al.</i>	
AVF operations in 2015 .....	275
T. Nakamura <i>et al.</i>	

Present status of the liquid-helium supply and recovery system .....	276
T. Dantsuka <i>et al.</i>	
Present status of the BigRIPS cryogenic plant .....	277
K. Kusaka <i>et al.</i>	
Maintenance of vacuum for accelerators .....	278
S. Watanabe <i>et al.</i>	
Operation of fee-based activities by the industrial cooperation team .....	279
A. Yoshida <i>et al.</i>	
Operation of the tandem accelerator .....	280
T. Kobayashi and M. Hamagaki	
Operation report on the ring-cyclotrons in the RIBF accelerator complex .....	281
M. Nishida <i>et al.</i>	

## V. EVENTS

CHEP2015 - 21st International Conference on Computing in High Energy and Nuclear Physics .....	283
Y. Watanabe	
TAN15 - 5th International Conference on the Chemistry and Physics of the Transactinide Elements .....	284
H. Haba	
The 9th Nishina School .....	285
H. Ueno and T. Kishida	
HIAT2015-13th International Conference on Heavy ion Accelerator Technology .....	286
N. Sakamoto and O. Kamigaito	
RIBF Users Meeting 2015 .....	287
N. Imai <i>et al.</i>	
Quark Matter 2015 .....	288
Y. Akiba, H. Hamagaki and T. Hatsuda	
Physics with Fragment Separators - 25th Anniversary of RIKEN Projectile Fragment Separator (RIPS25) .....	289
T. Kubo	

## VI. ORGANIZATION AND ACTIVITIES OF RIKEN NISHINA CENTER

### (Activities, Members, Publications & Presentations)

1. Organization .....	291
2. Finances .....	292
3. Staffing .....	293
4. Research publication .....	294
5. Management .....	294
6. International Collaboration .....	300
7. Awards .....	302
8. Brief overview of the RI Beam Factory .....	303
Theoretical Research Division	
Quantum Hadron Physics Laboratory .....	305
Theoretical Nuclear Physics Laboratory .....	315
Strangeness Nuclear Physics Laboratory .....	319
Sub Nuclear System Research Division	
Radiation Laboratory .....	322
Advanced Meson Science Laboratory .....	328
RIKEN-BNL Research Center .....	334
Theory Group .....	335
Computing Group .....	339
Experimental Group .....	346

RIKEN Facility Office at RAL .....	350
RIBF Research Division	
Radioactive Isotope Physics Laboratory .....	357
Spin isospin Laboratory .....	364
Nuclear Spectroscopy Laboratory .....	371
High Energy Astrophysics Laboratory .....	375
Astro-Glaciology Research Unit .....	378
Research Group for Superheavy Element .....	380
Superheavy Element Production Team .....	383
Superheavy Element Device Development Team .....	385
Nuclear Transmutation Data Research Group .....	387
Fast RI Data Team .....	388
Slow RI Data Team .....	390
Muon Data Team .....	391
High-Intensity Accelerator R&D Group .....	392
High-Gradient Cavity R&D Team .....	393
High-Power Target R&D Team .....	394
Accelerator Group .....	395
Accelerator R&D Team .....	396
Ion Source Team .....	398
RILAC Team .....	400
Cyclotron Team .....	401
Beam Dynamics & Diagnostics Team .....	404
Cryogenic Technology Team .....	406
Infrastructure Management Team .....	407
Instrumentation Development Group .....	409
SLOWRI Team .....	410
Rare RI-ring Team .....	414
SCRIT Team .....	418
Research Instruments Group .....	421
BigRIPS Team .....	422
SAMURAI Team .....	426
Computing and Network Team .....	428
Detector Team .....	430
Accelerator Applications Research Group .....	433
Ion Beam Breeding Team .....	434
RI Applications Team .....	438
User Liaison and Industrial Cooperation Group .....	444
RIBF User Liaison Team (User Support Office) .....	445
Industrial Cooperation Team .....	446
Safety Management Group .....	448
Partner Institution .....	451
Center for Nuclear Study, Graduate School of Science, The University of Tokyo .....	452
Center for Radioactive Ion Beam Sciences, Institute of Natural Science and Technology, Niigata University .....	465

Wako Nuclear Science Center, IPNS (Institute for Particle and Nuclear Studies),	
KEK (High Energy Accelerator Research Organization) .....	469
Events (April 2015 - March 2016) .....	471
Press Releases (April 2015 - March 2016) .....	472
<b>VII. LIST OF PREPRINTS</b>	
List of Preprints (April 2015 - March 2016) .....	473
<b>VIII. LIST OF SYMPOSIA, WORKSHOPS &amp; SEMINARS</b>	
List of Symposia & Workshops (April 2015 - March 2016) .....	477
List of Seminars (April 2015 - March 2016) .....	479