



**International Peer Review 2018**

## **Summary of selected outcomes**

- **Top 10 Key Performance Indicators**
- **Awards**
- **Publications**
- **Highly Qualified Personnel**

## TRIUMF Top 10 Key Performance Indicators

#	Indicator	Yearly Target	2013	2014	2015	2016	2017	Average
1	Number of publications	<b>280</b>	259	303	322	345	307	307
2	Percentage of cyclotron hours delivered	<b>90%</b>	95.7%	92.4%	88.7%	92.7%	89.0%	92%
3	Number of HQPs trained	<b>160</b>	181	187	244	219	251	216
4	Number of Canadian scientists and students using TRIUMF	<b>196</b>	128	140	189	205	369	206
5	Number of Canadian scientists and students participating in international projects through TRIUMF	<b>180</b>	190	210	216	216	227	211
6	Number of international visiting scientists and students	<b>300</b>	272	325	385	440	506	386
7	Number of Patient doses of Medical isotopes <sup>1</sup>	<b>2.4M</b>	1.9 M	1.9 M	1.9 M	1.9 M	1.9 M	1.9M
8	Number of participants at Informal Science Education events <sup>2</sup>	<b>6,000</b>	5,600	6,300	10,594	27,459	23,852	14,761
9	Number of Commercial agreements	<b>50</b>	72	93	108	104	139	103
10	Total Commercial Revenues across TRIUMF activities	<b>\$2.4M</b>	\$1.4M	\$2.9M	\$3.4M	\$4.1M	\$3.6M	\$3.1M

<sup>1</sup> Predominantly isotope doses produced by Nordion

<sup>2</sup> The accounting for participants at information science education events was revised in 2015

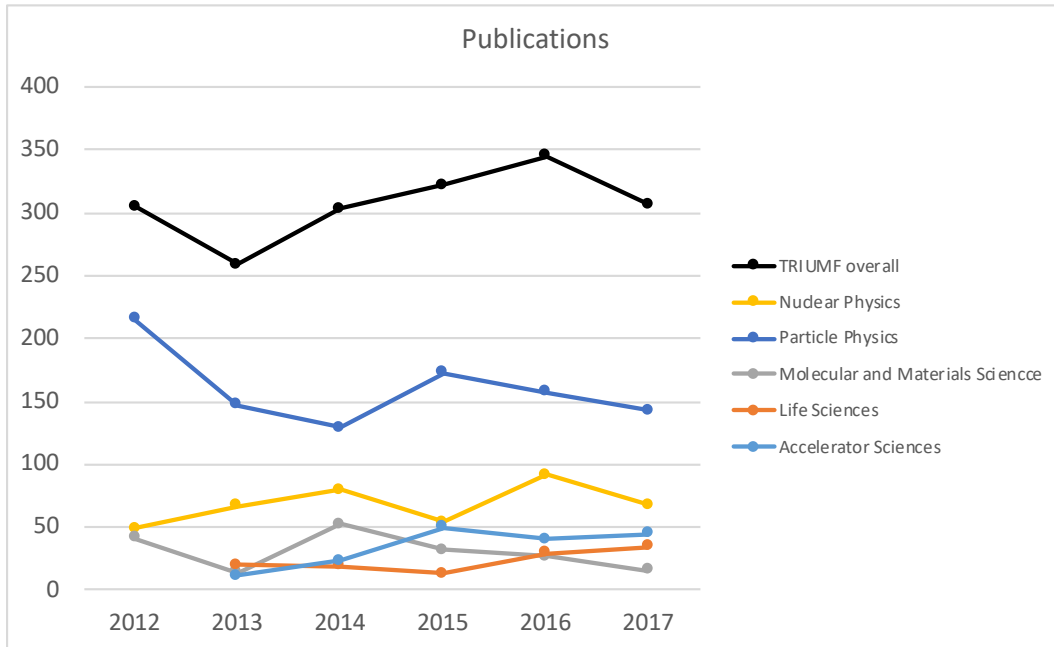
## Awards

TRIUMF scientists were recognized with a number of major awards since 2013. Here is a list of the most notable ones:

- **Breakthrough Prize in Fundamental Physics, 2016**
  - SNO (Rich Helmer, Reda Tafirout)
  - T2K (Akira Konaka, Dean Karlen, Fabrice Retiere)
- **NSERC Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering, 2015**
  - Paul Schaffer
  - Tom Ruth
- **NSERC John C. Polanyi Award, 2013**
  - Makoto Fujiwara
  - Art Olin
  - Dave Gill
- **Francis Pipkin Award of the APS, 2017**
  - Jens Dilling
- **Stuart Jay Freedman Award of the APS, 2018**
  - Ania Kwiatkowski
- **CAP Lifetime Achievement Medal, 2017**
  - Jean Michel Poutissou
- **CAP-TRIUMF Vogt Medal for Outstanding Experimental or Theoretical Contributions to Subatomic Physics**
  - Jens Dilling, 2013
  - Pierre Savard, 2015
  - Akira Konaka, 2016
- **Koshiba Prize (Foundation for High Energy Accelerator Science), 2018**
  - Kenji, Kojima
- **Fellows of the APS**
  - Petr Navratil, 2013
  - Makoto Fujiwara, 2016
  - Pierre Savard, 2016
  - Reiner Kruecken, 2017
- **World Council on Isotopes, President's Award, 2017**
  - Paul Schaffer
  - Tom Ruth
- **Business in Vancouver, Top Forty under 40, 2013**
  - Paul Schaffer
- **BCTECH Technology Impact Award, 2017**
  - ARTMS Products, Inc.

## Publications

Publications are one of the primary outputs of our multidisciplinary scientific endeavour. Over the last five years, our research and the operation of our user facilities has led to 1536 peer reviewed articles. This is a 20% increase over the period 2008-2012. The breakdown by year and sub-field is shown in the Figure below.

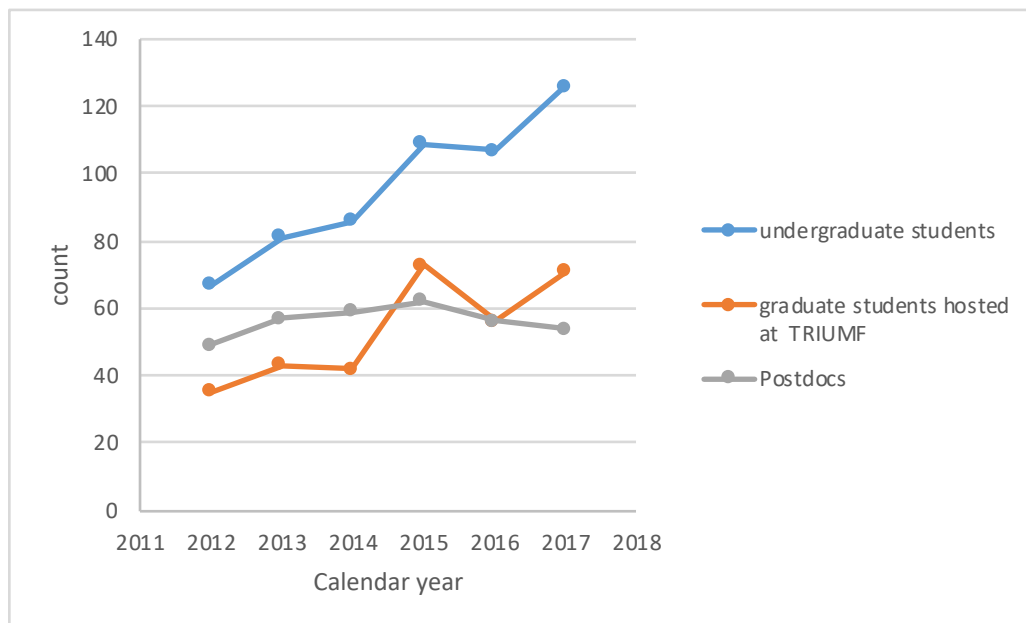


## Highly Qualified Personnel

### Students hosted at TRIUMF

At TRIUMF, one of our primary goals is inspiring the next generation of scientists and giving them a place where they can apply and develop the skills that they learn in university, while also contributing to TRIUMF's role as a research institution.

We are among the largest co-op employers in Canada, hosting 126 undergraduate students in 2017, a 88% increase from 2012. The jobs reflect the broad range of work performed at TRIUMF, from our core research disciplines to engineering, computing, business, and communications. We have over 50 times more applicants than available positions, making this an extremely competitive program with top-notch students, who often make very significant contributions to TRIUMF's program.



### NSERC CREATE program Isotopes for Science and Medicine (IsoSiM)

TRIUMF and UBC have jointly established IsoSiM, a NSERC funded Collaborative Research and Training Experience (CREATE) program to provide graduate students with the specific skills required for employment in isotope-related fields. This includes the development of new radioisotopes, and the promotion of innovative isotope applications in environmental science and medicine. IsoSiM gives trainees the tools they need to succeed as students and postdoctoral fellows as well as in their future career, be it in academia or the private sector.

Our IsoSiM program focuses on critical transitional skills by educating students in isotope applications. Trainees learn essential aspects of isotope production, preparation, and detection. Mobility is encouraged through our student placement program that builds on strong, existing collaborations between UBC, TRIUMF, and partners in Germany.

IsoSiM provides enriched training experiences in the production, preparation, and application of isotopes for science and medicine in world-class collaborative research environments. This is enhanced by professional skills development as well as internships in industrial and public sector partners of the program.

Interdisciplinary training and experiential learning activities empower students to become the next generation of leaders for isotope related activities, whether in industry, public health, environmental and governmental sectors, or academia.

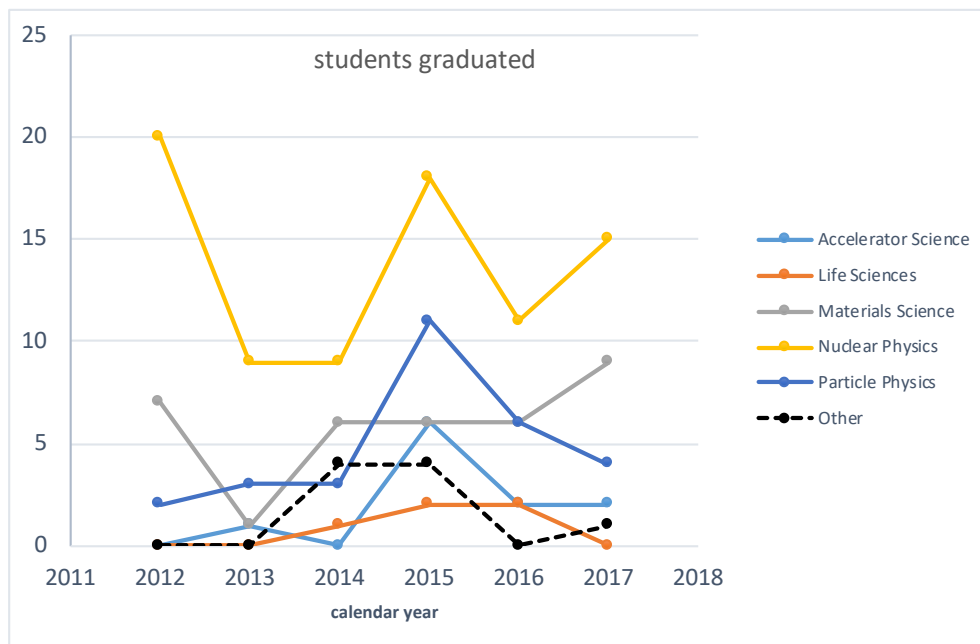
Today, IsoSiM has provided stipends to 20 Masters and 18 PhD students at UBC and TRIUMF across six different departments from four faculties: Physics (nuclear physics, accelerator science, materials science, medical physics), Chemistry (radiochemistry, materials science), Earth-Ocean-Atmospheric Sciences (environmental radiotracers), Pharmaceutical Sciences (radiopharmaceuticals), Radiology (medical imaging), Mechanical Engineering (isotope production, industrial imaging).

The program provides the stipend holders, as well as many members of TRIUMF's Graduate Students and Postdoc Society, with professional development workshops.

### Students Theses

Over the last five years 141 Masters and PhD students graduated with data taken at TRIUMF or under the supervision or co-supervision of our TRIUMF research scientists.

The breakdown by field is shown below. 'Other' includes thesis work on irradiation of electronics components as well as radioisotope use in Ocean Sciences.



Graduate students from across Canada and from around the world come to TRIUMF to take data and utilize our research infrastructure.

Below is a list of the theses that these students have created while working here.

### Theses - 2013

*M.Sc.*

A. Bader, *A new ion trap geometry for precision mass measurements at TRIUMF* (Ecole des Mines de Nante, MSc)

N. Bernier, *Study of the Photoproduction of  $^8\text{Li}$  with the Reaction  $^9\text{Be}(g,p)^8\text{Li}$*  (Universite Laval, MSc)

Z. Diggins, *Using capacitance to radiation-hardened flip-flops at advanced technology nodes* (Vanderbilt University, MSc)

B. Fenker, *Measurement of asymmetry parameters in  $^{37}\text{K}$ : Optical pumping of alkali atoms* (Texas A&M University, MSc)

P. Fortier, *Development of a Low-Pressure Ionization Chamber for Rare Isotope Experiments at IRIS* (Saint Mary's University, MSc)

M. Imai, *Syntheses and itinerant-electron magnetic properties of the layered cobalt phosphide  $\text{ACo}_2\text{P}_2$  ( $A = \text{Ca}, \text{Sr}, \text{Ba}, \text{La}$ )* (Kyoto, MSc)

J. Michetti-Wilson, *Characterization of  $\text{LaBr}_3(\text{Ce})$  Detectors for Picosecond Lifetime Measurements* (University of Guelph, MSc)

C. Nobs, *Simulating and Testing the TRIUMF Bragg Ionisation Chamber* (University of Surrey, MSc)

D. vom Bruch, *Studies for the PIENU Experiment and on the Direct Radiative Capture of Muons in Zirconium* (University of British Columbia, MSc)

*Ph.D.*

P. Adsley, *Test experiments for the indirect determination of the oxygen-15 and alpha radiative capture reaction rate in Type I X-ray bursts* (University of York, PhD)

C. Bojecho, *Simultaneous Analysis of Near and Far Detector Samples of the T2K Experiment to Measure Muon Neutrino Disappearance* (University of Victoria, PhD)

M. Davies, *The Search for New Resonances in Strong Symmetry Breaking Scenarios with the ATLAS Detector* (Université de Montréal, PhD)

N. Galinski, *Lifetime Measurement of the 6.79 MeV Excited State of  $^{15}\text{O}$  to Help Constrain the  $^{14}\text{N}(p,g)^{15}\text{O}$  Reaction Rate* (Simon Fraser University, PhD)

D. Howell, *First Determination of the  $^8\text{Li}$  Valence Neutron Asymptotic Normalization Coefficient Using the  $^7\text{Li}(^8\text{Li}, ^7\text{Li})^8\text{Li}$  Reaction* (Simon Fraser University, PhD)

## Theses - 2014

M.Sc.

R. Ashley, *Characterization of the First Stage Prototype of the TIFFIN Detector* (Simon Fraser University, MSc)

B. Heiss, *Experimental verification of the iPhos energy reconstruction method for the CALIFA Calorimeter* (Technische Universität München, MSc)

A. Leary, *Collinear Laser Spectroscopy on Neutron-Rich Rubidium Isotopes and Development of a Laser Frequency Locking System* (McGill University, MSc)

T. Macdonald, *Charge-breeding studies for high-precision mass measurements on short-lived nuclides at TITAN and a direct determination of the  $^{51}\text{Cr}$  electron-capture  $Q$ -value for neutrino physics* (University of British Columbia, MSc)

T. Medina, *Magnetic Characterization of  $\text{Y}_2\text{-xBixIr}_2\text{O}_7$ : A Muon Spin Rotation/Relaxation and Susceptibility Study* (McMaster University, MSc)

J. Trippe, *A Technique For Predicting The Muon Induced Upset Cross Section In Submicron Mos Devices Using Proton Tests And Simulation* (Vanderbilt University, MSc)

J. Xiao, *A  $\mu\text{SR}$  study of the interactions between muoniated radicals and metallic nanoparticles in mesoporous silica hosts* (University of British Columbia, MSc)

Ph.D.

C. Akers, *Radiative Capture Measurements of Astrophysically Important Reactions Using the DRAGON Separator* (University of York, PhD)

M. Carmona Gallardo, *Experimental Studies of the Astrophysical Nuclear Reaction  $^3\text{He}(\alpha, \gamma)^7\text{Be}$*  (Complutense University of Madrid, PhD)

I.C. Celik, *A particle-gamma coincidence study of  $^{26}\text{Na}$  using the transfer reaction  $^{25}\text{Na}(d, p \gamma)^{26}\text{Na}$*  (University of Surrey, PhD)

M. Dehghani Ashkezari, *Microwave Spectroscopy of Magnetically Trapped Atomic Antihydrogen* (Simon Fraser University, PhD)

A. Désilets-Benoit, *Étude du champ magnétique interne de deux matériaux magnétiques et d'un supraconducteur sans symétrie d'inversion* (Université de Montréal, PhD)

T.P. Friesen, *Probing Trapped Antihydrogen: In Situ Diagnostics and Observations of Quantum Transitions* (University of Calgary, PhD)



S. King, *A Search for Supersymmetry and Universal Extra Dimensions in Final States with Three Leptons and Missing Transverse Momentum in 20.7 fb<sup>-1</sup> of  $\sqrt{s} = 8$  TeV pp Collisions with the ATLAS Detector* (University of British Columbia, PhD)

N. Mahatme, *Design Techniques for Power-Aware Combinational Logic SER Mitigation* (Vanderbilt University, PhD)

P. Mengyan, *Magnetism in Mn-Doped Chalcopyrites* (Texas Tech University, PhD)

E. Price, *Synthesis, Evaluation, and Application Of New Ligands for Radiometal Based Radiopharmaceuticals* (University of British Columbia, PhD)

D.M. Semeniuk, *Copper Nutrition And Transport Mechanisms In Plankton Communities In The Northeast Pacific Ocean* (University of British Columbia, PhD)

S. Swedish, *Searches for new resonances decaying to top-antitop quark pairs with the ATLAS detector in  $\sqrt{s} = 7$  TeV proton-proton collisions* (University of British Columbia, PhD)

C. Tsimba, *Cross Section Measurements for the Nucleosynthesis of Heavy Nuclei and Type Ia Supernovae* (University of York, PhD)

S. Viel, *Search for new neutral high-mass resonances decaying into muon pairs with the ATLAS detector* (University of British Columbia, PhD)

## Theses - 2015

M.Sc.

J. Abernathy, *A Control System for the E-Linac View Screen System* (University of Victoria, MSc)

N. Evetts, *Cavity Cooling of Leptons for Increased Antihydrogen Production at ALPHA (Antihydrogen Laser Physics Apparatus - experiment at Antiproton Accelerator at CERN)* (University of British Columbia, MSc)

D. Fujimoto, *A low gain fine mesh photomultiplier tube for pure CsI* (University of British Columbia, MSc)

O.J. Hernandez, *Nuclear Structure Corrections in Muonic Deuterium* (University of Manitoba, MSc)

R. Kitamura, *Study and development of muon sources towards ultra-cold muon beam for the J-PARC g-2/EDM experiment* (University of Tokyo, MSc)

A. Kobayashi, *Positron annihilation and muon spin rotation studies of lattice defects introduced in hydrogen absorption-desorption process of pure palladium* (Osaka University, MSc)

- A. Kumar, *Investigating the three-nucleon force through  $^{10}\text{C}(p,p)$  elastic scattering* (Saint Mary's University, MSc)
- M. Li, *Study of Layout Techniques in Dynamic Logic Circuitry for Single Event Effect Mitigation* (University of Saskatchewan, MSc)
- M. Miorelli, *Coupled Cluster Theory for Giant Resonances in Calcium Isotopes* (University of Trento, MSc)
- R. Porter, *An electronic model of the ATLAS Phase-1 Upgrade Hadronic Endcap Calorimeter Front End Crate Baseplane* (University of Victoria, MSc)
- A. Radich, *Nuclear Structure of  $^{124}\text{Xe}$  Studied with Beta+/EC Decay* (University of Guelph, MSc)
- U. Rizwan, *Development of Gamma-Ray Spectroscopy Techniques for Fundamental and Applied Research* (Simon Fraser University, MSc)
- S. Seeraji, *GEANT4 Simulations of Electron Capture Branching Ratio Measurements for the TITAN Facility* (Simon Fraser University, MSc)
- K. Singhrao, *Analysis of the After pulsing and the Dark Noise Spectrum From the DEAP-3600 Detector* (University of Alberta, MSc)
- J. Smith-Forrester, *Structural and functional imaging of tauopathies* (University of British Columbia, MSc)
- C. Starling, *Sensitivity Studies of beta-Delayed Neutron Emission Probabilities Using the r-Java 2.0 Nucleosynthesis Code* (University of Surrey, MSc)
- Q. Wu, *Study SEU in SRAM* (University of Saskatchewan, MSc)
- Ph.D.*
- B.B. Baker, *Charged Muonium Diffusion in Indium Oxide and Other Transparent Conducting Oxides* (Texas Tech University, PhD)
- N. Blinov, *Phase transitions: applications to physics beyond the Standard Model* (University of British Columbia, PhD)
- H. Bouzomita-Zran, *Mesure de precision de la décroissance super-permise de  $^{18}\text{Ne}$*  (Université de Caen Normandie, PhD)
- A. Capra, *Testing CPT and Antigravity with Trapped Antihydrogen at ALPHA* (York University, PhD)
- J.-F. Caron, *Cluster counting in drift chambers for particle identification and tracking* (University of British Columbia, PhD)
- R. Collister, *Towards Atomic Parity Violation at the Francium Trapping Facility* (University of Manitoba, PhD)

- D. Connolley, *Radiative alpha capture on S-34 at astrophysically relevant energies and design of a scattering chamber for high precision elastic scattering measurements for the DRAGON experiment* (Colorado School of Mines, PhD)
- A. Gallant, *Penning trap mass measurements to test three-body forces in atomic nuclei* (University of British Columbia, PhD)
- C. Gong, *A Novel Optimization Platform and Its Applications to the TRIUMF Energy Recovery Linac* (University of British Columbia, PhD)
- A. Guiterrez, *Cold antihydrogen experiments and radial compression of antiproton clouds in the ALPHA apparatus at CERN* (University of British Columbia, PhD)
- A. Infantino, *Advanced aspects of radiation protection in the use of particle accelerators in the medical field* (Universita degli studi di Bologna, PhD)
- S. Kobayashi, *Orbital ordering and electron transfer in the triangular-lattice compound CrSe<sub>2</sub> with unusual-valent chromium* (Kyoto University, PhD)
- A. Laffoley, *High-Precision Half-Life Measurements for the Superallowed Fermi Beta Emitters <sup>14</sup>O and <sup>18</sup>Ne* (University of Guelph, PhD)
- A. Lennarz, *Electron-capture-branching ratio measurements for the intermediate nuclei in double beta decay* (Westfaelische Wilhelms Universitaet Muenster, PhD)
- Z. Lotfi Mahyari, *Universal inhomogeneous magnetic-field response in the normal state of cuprate high-T<sub>c</sub> superconductors* (Simon Fraser University, PhD)
- H. Man, *The synthesis of iron-based superconductor LiFeP and novel diluted magnetic semiconductors and research on their physical properties* (Zhejiang University, PhD)
- L. Martin, *TACTIC: The TRIUMF Annular Chamber for Tracking and Identification of Charged Particles* (University of Szczecin, PhD)
- T.G. McCarthy, *Measurement of the Top Quark Mass in the All-Hadronic Top-Antitop Decay Channel Using Proton-Proton Collision Data from the ATLAS Experiment at a Centre-of-Mass Energy of 8 TeV* (Carleton University, PhD)
- T. Nsangu, *Cross section measurements of the nucleosynthesis of heavy nuclei and type 1a supernovae* (University of York, PhD)
- Y. Ren, *Single-Event Transient Study on CMOS Voltage Reference Circuits* (University of Saskatchewan, PhD)
- R. So, *Search for a light Higgs boson with the BABAR detector: with proposals to improve drift chamber aging studies and particle identification* (University of British Columbia, PhD)

R. Spencer Behling, *Measurement of the Standard Model Beta Asymmetry Parameter,  $A_{beta}$ , in  $^{37}\text{K}$*  (Texas A&M University, PhD)

J. Tomlinson, *Measurement of  $^{23}\text{Na}(\alpha, p)^{26}\text{Mg}$  at energies relevant to  $^{26}\text{Al}$  production in massive stars and nucleosynthesis in Type 1a supernovae* (University of York, PhD)

J. Zhang, *Spectroscopy with Laser-cooled Francium and Progress on Atomic Parity Non-conservation* (University of Maryland, PhD)

## Theses - 2016

*M.Sc.*

T. J. Buck, *Muon spin rotation characterization of superconducting niobium for applications in high field superconducting radio frequency cavities* (University of British Columbia, MSc)

J. Fu, *Studies of the  $K^+ \rightarrow \pi^+\pi^0$  background for the measurement of  $K^+ \rightarrow \pi^+\nu\nu$  and  $\pi^0 \rightarrow \nu\nu$  decays* (University of British Columbia, MSc)

F.H. Garcia, *Calculation of rates for radioactive isotope beam production at TRIUMF* (Simon Fraser University, MSc)

C. Gomez, *TF-muSR Sensitivity to Charge Density Wave Order in  $2\text{H-NbSe}_2$*  (Simon Fraser University, MSc)

S. Hallam, *Designing CEDAR, Conversion Electron Detection Array* (University of Surrey, MSc)

A. MacLean, *Gamma-Gamma Angular Correlation Measurements with GRIFFIN* (University of Guelph, MSc)

M. Newton, *Using pulsed laser to study single event effects in integrated circuits* (University of Saskatchewan, MSc)

C. Penenr, *Characterizing the Response of a Novel Scintillation Detector* (National University of Ireland, Galway, MSc)

Z. Shahriari, *An Extremum Seeking Control System for Control of RF Cavity Resonators* (Simon Fraser University, MSc)

D. Ziat, *Study of magnetic systems by muon spin rotation and specific heat* (Universite de Sherbrooke, MSc)

*Ph.D.*

U. Chowdhury, *A cooler Penning trap to cool highly charged radioactive ions and mass measurement of  $^{24}\text{Al}$*  (University of Manitoba, PhD)

J. Crawford, *New technologies for  $^{211}\text{At}$  targeted  $\alpha$ -therapy research using  $^{211}\text{Rn}$  and  $^{209}\text{At}$*  (University of Victoria, PhD)

C. David, *Search for Supersymmetry using a Higgs boson in the decay cascade with the ATLAS detector at the Large Hadron Collider* (University of Victoria, PhD)

B. Frandsen, *Quantum phase transitions and local magnetism in Mott insulators: A local probe investigation using muons, neutrons, and photons* (Columbia University, PhD)

A. Gutierrez, *Cold Antihydrogen Experiments and Radial Compression of Antiproton Clouds in the ALPHA Apparatus at CERN* (University of British Columbia, PhD)

V. Margerin, *Transfer reaction measurements and the stellar nucleosynthesis of  $^{26}\text{Al}$  and  $^{44}\text{Ti}$*  (University of Edinburgh, PhD)

J. Myslik, *Measurement of muon antineutrino disappearance in the T2K Experiment* (University Victoria, PhD)

J. Tanaka, *Halo-induced dipole excitation of  $^{11}\text{Li}$  studied via proton inelastic scattering* (Osaka University, PhD)

S. Tobayama, *An Analysis of the Oscillation of Atmospheric Neutrinos* (University of British Columbia, PhD)

## Theses - 2017

M.Sc.

C. Bruulsema, *Calibration and Commissioning of the Helium and Lead Observatory* (Laurentian University, MSc)

J. Claude, *Recherche d'un boson de Higgs doublement chargé par diffusion de bosons vectoriels à désintégration leptonique dans le modèle de Georgi-Machacek avec le détecteur ATLAS au LHC* (Université de Montréal, MSc)

A. Finlay, *Integration of a Multi Reflection Time of Flight Isobar Separator into the TITAN Experiment at TRIUMF* (University of British Columbia, MSc)

M. Foster, *An Upgrade of the TITAN-EBIT High Voltage Operation for Investigations into Decay Rate Modifications by Highly Charged Ions* (University of Surrey, MSc)

F. Goto, *Search of T-Violation in polarized  $\text{Li-8}$  beta decay* (Nagoya University, MSc)

M. Kondo, *Change in muon Knight shift in pure Pd by hydrogen absorption-desorption process* (Osaka University, MSc)

J. Li, *Particulate Trace Metals & Iron Availability to Phytoplankton* (MIT & Woods Hole Oceanographic Institution, MSc)

G. Liu, *Chemical Physics of Supercritical Water-Cooled Reactors* (Mount Allison University, MSc)

J. Measures, *The decay of  $^{26}\text{Na}$  studied with the GRIFFIN spectrometer* (University of Surrey, MSc)

Y. Shimizu, *Development of Equipment for N-Correlation Measurement and T-Violation Experiment using Cylindrical Drift Chamber at TRIUMF* (Rikkyo University, MSc)

P. Zandille, *A High Precision Branching Ratio Measurement In  $^{19}\text{Ne}$  Beta Decay* (University of Zululand, MSc)

D. Ziat, *Étude de systèmes magnétiques par rotations de spins de muons et chaleur spécifique* (Université de Sherbrooke, MSc)

*Ph.D.*

W. Al Tamimi, *Collinear laser spectroscopy on exotic isotopes of rubidium and gallium* (McGill University, PhD)

A. Chester, *Recoil distance method lifetime measurements of the  $2_1^+$  excited states in  $^{84}\text{Kr}$  and  $^{94}\text{Sr}$*  (Simon Fraser University, PhD)

S.C. Cheung, *Understanding iron-pnictide superconductors using Muon spin rotation and scanning tunneling microscopy with nonconvex optimization* (Columbia University, PhD)

S. Cruz, *Single particle structure of exotic strontium isotopes* (University of British Columbia, PhD)

D. Cross, *The Study of  $^{116}\text{Sn}$  via Conversion-Electron Spectroscopy and  $\gamma$ - $\gamma$  Angular Correlations* (Simon Fraser University, PhD)

F. Dallaire, *Recherche de quarks vectoriels produits par l'échange de gluons lourds dans le cadre de modèles de Higgs composite avec le détecteur ATLAS* (Université de Montréal, PhD)

C. Ding, *The Synthesis and Characterization of 1111-type New Diluted Magnetic Semiconductors:  $(\text{La}_{1-y}\text{AE}_y)(\text{Zn}_{1-x}\text{Mn}_x)\text{AsO}$  (AE = Ca, Sr, Ba)* (Zhejiang University, PhD)

L. Evitts, *Electric Monopole Transition Strengths in the Stable Nickel Isotopes* (University of Surrey, PhD)

A. Hallas, *The Effect of Chemical Pressure on the Magnetic Ground States of Rare Earth Pyrochlores* (McMaster University, PhD)

E. Hill, *Search for direct scalar top pair production in final states with two tau leptons in pp collisions at  $\sqrt{s} = 8$  TeV with the ATLAS Detector at the Large Hadron Collider* (University of Victoria, PhD)

- W. Lee, *Studies on Strongly Correlated Electron Systems by using Muon spin rotation/relaxation technique* (Chung-Ang University, PhD)
- R. Lui, *Study of Radiation Effects on 28nm UTBB FDSOI Technology* (University of Saskatchewan, PhD)
- M. Marchetto, *Magnetic field study for a new generation high resolution mass separator* (University of British Columbia, PhD)
- M. Miorelli, *Electromagnetic properties of medium-mass nuclei from coupled-cluster theory* (University of British Columbia, PhD)
- M. Mozafari, *Investigation of H atom and free radical behavior in gas hydrates* (Simon Fraser University, PhD)
- J. Park, *Decay spectroscopy of  $N \sim Z$  nuclei in the vicinity of  $^{100}\text{Sn}$*  (University of British Columbia, PhD)
- J.S. Randhawa, *Investigations on states of  $^{20}\text{Mg}$  and spallation reaction effects for constraining nuclear physics inputs for X-ray bursts* (Saint Mary's University, PhD)
- T. Sullivan, *A high-precision measurement of the  $\pi \rightarrow e\nu$  branching ratio* (University of British Columbia, PhD)
- A. Teigelhoefer, *Laser Resonance Ionization Spectroscopy of At and Ac for optical isotope shift determination* (University of Manitoba, PhD)
- X.-L. Xu,  *$\mu\text{SR}$  Study on Exotic Ferroelectric Transitions in Hydroxyl Salts  $\text{Co}_2(\text{O}[\text{H}/\text{D}])_3\text{X}$*  (Saga University, PhD)