Fluxional Molecules: L. F. Pašteka and T. Fallon et al. describe a new synthetic route towards bullvalenes and analyze the rearrangement networks of these compounds by automated quantum-chemical calculations. Here a practical synthesis of bullvalene and a variety of mono- and disubstituted analogues through cobalt-catalysed [6+2] cycloaddition of cyclooctatetraene to alkynes, followed by photochemical di-π-methane rearrangement is described. The application of isomer-network analysis, coupled with quantum-chemical calculations, provides a powerful automated tool for predicting the properties of bullvalene isomer networks. (for details see Oussama Yahiaoui, Lukáš F. Pašteka, Bernadette Judeel and Thomas Fallon, Angew. Chem. Int. Ed. 2018, 57, 2570).
**Objectives of the Research Centre:** Our objective is to advance and disseminate knowledge in the area of theoretical/computational chemistry and physics, and to maintain high international standards in this research field only matched by top research institutes worldwide.

All objectives are clearly met, as we are one of the most productive and internationally acclaimed theoretical research centres in New Zealand, with truly outstanding performances by each of our staff members. Our research centre has not been without a Marsden grant running since it was established in 2004. Joachim Brand is actively involved in the Dodd-Walls CoRE for Photonics and Quantum Technologies, and four members were part of the Norwegian Centre for Advanced Study (CAS) to perform research in the field of Chemistry at Extreme Conditions (Elke Pahl, Lukas Paštéka, Peter Schwerdtfeger and Krista Steenbergen). Both JB and PS are part of an Australian ARC Centre of Excellence for Computational Theoretical Physics bid to the Australian government. PS is part of a new CoRE initiative of Auckland University to address ecology/socio-ecological systems/connected ecosystems/connected solutions. PS has also filed a Dumont d’Urville application in 2018 together with the atomic physics group at CNRS (CE), Laboratoire Kastler Brossel in Paris, which has just come through fully funded (NZ$ 80,000 for 2 years). Our articles appear regularly in top international journals (this year we had one paper in Physical Review Letters on the heaviest element in the periodic table, oganesson, and two in Angewandte Chemie on the melting point of radon and on the complex dynamics of the bullvalene molecule). The many high-standing international visitors who joined our research centre in 2018, and the many invitations to international conferences and talks at universities received by our staff, are a clear indication of our success and worldwide recognition.

**Research Output:** This year we published over 30 articles in international journals.

**Activities and achievements:** All members of CTCP were actively involved in chemistry, physics or biology teaching as outlined in Appendix 4. Almost all postdoctoral fellows helped in laboratory teaching at year 1 level. All articles are published in highly acclaimed international journals of high impact factors. Amongst the outstanding achievements this year is the world-wide attention and press releases on the unusual electronic structure of oganesson. The paper is already considered as a classic in the field of heavy element research.

**The Future - Opportunities, Risks and Directions:** We are (and continue to be) a top research centre of international high standing. This we achieve despite rather limited financial resources available and little moral support. The risks are very clear: Other universities overseas are far better resourced, and we have already experienced the loss of excellent staff (e.g. Prof. Sergej Flach). Yet we are contributing enormously to the international reputation of Massey University.

**Work in progress:** See attachment for more details.

**Financial:** See Appendix 4.
Acknowledgment: The Director is grateful to all CTCP members for their (again) outstanding performance and very hard work in 2018 despite many setbacks, and wishes everybody an even more successful and productive year 2019 despite the financial squeeze imposed upon the College of Science. My very special thanks goes to our Institute’s secretary, Mrs Vesna Davidovic-Alexander (IAS), who has helped us so much to run our research centre, organizing conferences and meetings, looking after our overseas visitors. We acknowledge on-going support by the Pro-VC Prof. Ray Geor and Dist. Prof. Gaven Martin, as well as Liz Thaisen (for financial advice). We are also grateful to Mike Yap for his excellent support in terms of system administration.

Distinguished Prof. Peter Schwerdtfeger
Director of CTCP, DHOI NZIAS
Date: Tuesday, 20 February 2019
Appendix 1

Research and Teaching Objectives for 2019

- J. Brand will continue work on his Marsden project “Playing dice with Fermi: Full configuration interaction quantum Monte Carlo for fermionic superfluids”, which was recently extended to the end of April 2021. We will have a changeover in postdoctoral fellows on this project (Dr. U. Ebling is finishing his contract in May and Dr. P. Jeszenszki is starting in February). A new PhD student, Mingrui (Ray) Yang will be working full time on the project and is expected to pass through PhD confirmation in March. J. Brand will also continue to lead the project “QF2b: Topological excitations and gauge theories” funded by the Dodd-Walls Centre (a TEC-funded CoRE) as PI. A postdoctoral fellow (Dr. J. Major) will be working full time on this throughout the year and another Dodd-Walls funded postdoctoral fellow will be recruited later this year (for a one-year position) in order to strengthen the project. J. Brand will further apply for new Marsden funding in the 2019 round after becoming eligible again to apply as a PI. In June 2019 J. Brand is expecting to visit Taiwan funded by the Taiwanese Science Ministry in order to continue his long-running research collaboration with Shih-Chuan Gou. Later in the year a research collaborator from Germany is expected to visit Massey University. On the teaching side, J. Brand is expecting a new PhD student, Sarthak Choudhury from India to start in the first quarter of 2019. During the same time frame, current PhD student Peter Jeszenszki is expected to graduate. In 2019 J. Brand will teach in the undergraduate courses 124.226 Quantum and Statistical Physics and 124.261 Nonlinear Physics and Chaos, which he is also coordinating.

- E. Pahl will continue her work on melting of Neon cluster/infinite system in strong magnetic field in collaboration, melting of water clusters, development and implementation of Full-CI Quantum Monte Carlo method to bosonic systems, and together with Prof. P. Schwedtfeger and AProf. Shaun Cooper the computation of lattice sums. Collaboration partners include Dr Stella Stopkowicz (University of Mainz, Germany), Ass. Prof. Andy Teale (University of Birmingham, UK), Prof. Trygve Helgaker (University of Oslo, Norway), Prof. Michele Paesani (University of San Diego, US), Prof. Ali Alavi (Max-Planck Institute Stuttgart, Germany) and Prof. Joachim Brand (Massey). She will move to a senior lecturer position at the physics department at the University of Auckland on February 1st.

- M. Raduban will finish work on her Tohoku University collaborative research grant on band gap calculations of XAG (X = Y, Lu and Gd) crystals for scintillator applications and on her Osaka University collaborative research grant on the investigation of APLF glasses as neutron scintillators. Both projects will end in March 2019. She will then start work on her MURF grant on the numerical and experimental exploration of wide band gap scintillators. Earlier in the year, M. Raduban will host Prof. Sarukura for a one-week visit to Massey University. M. Raduban will then visit Osaka University, Japan (hosted by Prof. Nobuhiko Sarukura) and Vietnam Academy of Science and Technology, Vietnam (hosted by Dr. Pham Hong Minh). On invitation by A/Prof. Jakrapong Kaewkhaow, she will also visit Nakhon Pathom Rajabhat University (Thailand) to start a new collaboration on rare earth-doped glass lasers. M. Raduban will continue working with Prof. Wei-Nai Chen at the Research Center for Environmental Changes (Taiwan) on a new collaboration that will develop an ultraviolet laser for laser radar monitoring of ozone and sulfur dioxide in the atmosphere. To strengthen her capabilities for numerical calculations of the electronic and optical properties of crystals for laser and scintillator applications, M. Raduban will attend the school on “Density-functional theory and beyond–high-throughput screening and big-data analytics, towards exa-scale computational materials science” in Barcelona, Spain from August 26–September 5. In regards to teaching, she
will continue to coordinate the courses 124.171 and 124.172 (Physical Principles for Engineering and Technology 1 and 2) and teach into 124.111 (Physics for Life Sciences). She is also part of the Curriculum Design Group for the new first year Physics courses that will be implemented in 2020.

– P. Schwerdtfeger will continue his work on the Marsden grant (together with Prof. Witek Nazarewicz, Michigan State) to understand the nuclear structure and physical behaviour of the heaviest elements in the periodic table. He will also start on a Dumont d’Urville funded collaboration on the electronic structure of superheavy elements together with Prof. Paul Indelicato (Paris). The scholarship allows also for two symposia on this topic, one in 2019 in New Zealand, and the other on in 2020 in Paris. These funded projects will involve longer visits by PS, Morten Piilebeht (PhD candidate) and Odile Smits (postdoctoral fellows) to both labs in Paris and Lansing. PS will collaborate with several research groups overseas, for example with Victor V. Flambaum (Sydney), Lukas Pašteka (Bratislava), and Anastasia Borschevsky (Groningen) on physics beyond the standard model. Research will also focus on lattice sums (together with AProf. Shaun Cooper), and quantum confinement (together with Prof. Hans-Joachim Werner, Stuttgart). Further, there is a commitment to visit Oslo again in November 2019 as our research center was part of a Norwegian CAS grant on “Molecules in Extreme Environments”. For 2019, PS is also an invited/plenary speaker at a number of international conferences and meetings overseas, and organizer of a conference on the “Mathematical Methods in Chemistry” in Rota, Spain. Two of my PhD students will finish beginning of 2019. PS will also be busy giving public lectures overseas on the Periodic Table celebrating the 2019 International Year of the Periodic Table.
Appendix 2

1. Research Output, Publications and Reports
Articles published in 2018 refereed journals (2018 members of CTCP are in bold letters):


**Refereed Conference Proceedings and arXiv:**


**Chapters in Books:**
NA

**Software developments:**

J. Brand, E. Pahl, M. Yang: Julia FCIQMC: A Julia program to calculate ground state properties of bosonic systems.

P. Schwerdtfeger: Program SAMBA: A Fortran program to calculate solid state properties through many-body expansions.

P. Schwerdtfeger: Program LatticeSum: A Fortran program to calculate lattice sums for cubic and hexagonal closed packed lattices.


2. Conference and Workshop Presentations

Lectures at Conferences / Meetings / Workshops:

- J. Brand gave invited talks at the Heraeus Seminar “Research Frontiers in Ultracold Quantum Gases” in Bad Honnef, Germany, Dec. 17 – 21; the workshop “Transport in strongly correlated quantum systems” in Natal, Brazil, 16 July – 3 August; the International Conference “Nonlinear Phenomena in Bose Condensates and Optical Systems” in Tashkent, Uzbekistan, 14 – 17 August; the Humboldt Kolleg “Controlling quantum matter: from ultracold atoms to solids” in Vilnius, Lithuania, 30 July – 1 August; the “La Laguna 1st International Workshop on Degenerate Quantum Gases: Persistent Currents, Vortices, and Solitons” in La Laguna, Spain, 10 – 11 December.


- E. Pahl gave invited talks on “Melting Transitions in Extreme Environments” at the Molecules in Extreme Environments conference in Oslo, January 15-17, and the AMMEE 2018 in Oslo in June and on “Monte Carlo Melting Simulations of Systems with Several Degrees of Freedom” at CMMSE 2018 in Cadiz, Spain. In December, she gave an invited talk on “Full CI Quantum Monte Carlo for Bosonic Systems” at a workshop on Frontiers in Quantum matter at the ANU in Canberra. In December, she delivered Monte-Carlo workshops on the QUACCS summer school in Kioloa, coastal campus of the ANU in Australia. She also delivered an invited talk on “High-Pressure Physics” at New Zealand Association for Gifted Children NZAGC conference in March.

- M. Raduban gave invited talks on “Spectroscopy of praseodymium-doped APLF glass scintillator using synchrotron radiation” at the Optics and Photonics International Congress - Conference on Laser and Synchrotron Radiation Combination Experiment 2018 (OPIC-LSC2018) in Yokohama, Japan, April 25–27 and on “Numerical and experimental investigation of fluoride-based laser crystals” at the 10th International
Conference on Optics and Applications (ICPA-10) in Ha Long City, Vietnam, November 11–15.

- P. Schwerdtfeger gave an invited talk on “High Pressure Simulations - Squeezing the Hell out of Atoms” at the CAS Symposium, Norwegian Academy of Sciences (Prof. Dage Sundholm’s 60th birthday celebration), Oslo, January 15-17; a keynote lecture on “From the Schrödinger Equation to the Standard Model and Beyond” at the ICQC2018, International Conference on Quantum Chemistry, Menton, France, June 18-23; an invited talk on “Variation of Fundamental Constants in Space-Time” at the 15th Marcel Grossmann meeting (MGXV), organized by ICRA at Sapienza University of Rome, July 1-7 (2018); an invited talk on “The Lennard-Jones Potential Revisited: Analytical Solutions for the Solid State from Lattice Sums and Epstein Zeta Functions” at CMMSE2018, 17th International Conference on Computational and Mathematical Methods in Science and Engineering, Rota, July 9-14; an invited talk on “Relativistic Effects in the Chemistry and Physics of Gold” at the Gold2018, 8th International Conference on Gold Chemistry, Paris, July 15-18; a keynote lecture on “When Gold meets Relativity” at the 2nd International Symposium on New Molecules and Clusters, Shanghai, August 18-20; a keynote lecture on “Accurate Dipole Polarizabilities from Relativistic Electronic Structure Theory - from Atoms to Clusters and the Solid State” at the ICAMDATA2018, 11th International Conference on Atomic and Molecular Data and Their Applications, Harvard University, Cambridge, November 11-15; a plenary lecture on “From the Schrödinger Equation to the Standard Model and Beyond” at the AISAMP2018, 13th Asian International Seminar on Atomic and Molecular Physics, December 3-8, Mumbai, India.

Seminars and Talks:

- J. Brand gave seminar talks at the Institut für Laserphysik in Hamburg, Germany, 3 August and at the Fachbereich Physik, University of Kaiserslautern, Germany, 14 December.
- P. Jerabek gave a seminar on "Computing Properties of Elusive Elements with Accurate Ab-Initio Methods" at the Department of Chemistry, University of Otago, Dunedin, April 24.
- E. Pahl gave a seminar on “Melting of Nanoclusters and Extended Systems Under Extreme Conditions” in October within the AI Seminar Series at the Mac Diarmid Institute and an INMS seminar on “Melting of Neon Clusters in Strong Magnetic Fields” in August.
- P. Jeszenszki gave a talk on “Accelerating the convergence of exact diagonalization with the transcorrelated method” at the Dodd Walls Center seminar in Massey University, Albany, August 17.
- M. Raduban gave an INMS talk on “Towards ultrafast high peak power ultraviolet lasers”, MU Albany, October 19.
- P. Schwerdtfeger gave invited talks on “From Kissing Hard Spheres to Lennard-Jones Like Clusters” at the Max-Planck Institute of Solid-State Physics, Stuttgart, February 2; on “When Gold meets Relativity” at the Hylleras Centre, University of Oslo, April 6; on “From Kissing Hard Spheres to Lennard-Jones Like Clusters” at CAS, Norwegian Academy of Sciences, April 11; on “From Kissing Hard Spheres to Lennard-Jones Like Clusters” at Philipps University Marburg, April 23; on “The beautiful world of polyhedra - but how can we classify them?”, INMS seminar, August 24.
- O. Smits gave a talk on “ a quick dip into the pool of noble gases” at the yearly McDiarmid meeting, November 20; on “Ab-initio Monte Carlo melting of the noble gases” at CMMSE-18, Spain, July 9.
M. Yang gave a talk on “Full Configuration Interaction Quantum Monte Carlo (FCIQMC) and its application in bosonic quantum phase transitions” at the 2018 MacDiarmid Institute Cluster Hui (September 4, 2018, Whakapapa Village, New Zealand), a talk at INMS Postgraduate Students’ Conference (October 25, 2018) and a CTCP internal seminar talk.

Poster Presentations:

- J. Brand presented a poster on “Quantum Dark Solitons in 1D Quantum Gases” at the International Conference for Atomic Physics (ICAP) in Barcelona, Spain, 22 – 27 July and co-authored three postgraduate posters at the “11th Annual Dodd-Walls Centre Symposium” in Auckland, 27 – 29 July.
- E. Pahl presented a poster on “Parallel-Tempering Monte Carlo Melting Simulations of the Heavy Rare Gases” at the ICQC2018 in Menton, France.
- P. Jerabek presented a poster on ”Relativistic Effects in the Heaviest Element of the Periodic Table” at the STC 2018, 54th Symposium für Theoretische Chemie, September 17-20, Halle (Saale), Germany.
- P. Jeszenszki presented a poster on “Improving Basis Set Convergence in Full Configuration Interaction: Ultracold Fermions in One Dimension” at FINESS in Wanaka, New Zealand, February 19-23; on “Accelerating the convergence of exact diagonalization with the transcorrelated method: Application to the one-dimensional Fermi gas with contact interactions” at DWC symposium in Auckland, New Zealand, June 26-29.
- M. Raduban presented a poster on “Optimized side-pumping configurations for the development of a Ce:LiCAF terawatt ultraviolet amplifier” at the SPIE Photonics West conference in San Francisco, California, USA, January 27 – February 1.
- O. Smits presented a poster on “Oganesson, the noble solid. Ab-initio Monte Carlo melting simulations of the heavy noble gases”.
- M. Yang presented a poster on “A stochastic approach to the exact diagonalization study of bosonic quantum phase transitions” at the 2018 Dodd-Walls Centre Symposium in Auckland, New Zealand, June 26 - 29, 2018.
Appendix 3

1. RESEARCH

Current Areas of Research Activities:

Biomolecular Simulations
Cluster Simulations and Phase Transitions, Nanoscience
Confined Atoms and Molecules
Development of new methods for electronic structure calculations
Electron Electric Dipole Moment
Electroweak Electronic Structure Theory
Force Field Parameterisation
Frequency shifts in atomic clocks
Full Configuration Interaction Quantum Monte Carlo for bosonic systems
Graph theoretical and topological properties of fullerenes
Heterogeneous and Homogeneous Catalysis
High-Pressure Physics
Integrated Nanophotonics
Lattice Sums for extended systems
Macroscopic quantum superpositions
Matter-wave bright solitons
Method of Increments for bulk properties
Multiscale Simulation
Nonlinear waves in Bose-Einstein Condensates
Nonlinear classical and quantum waves in disordered potentials
Nonlinear photonic systems
Non-equilibrium phase transitions
Non-perturbative QED
Nuclear anapole moment
One-dimensional quantum fluids
Optical properties for VUV lasers and scintillators
Parity violation in molecules
Polariton condensate network dynamics
Physics beyond the Standard Model.
Plane-wave pseudopotential development
Quantum dynamics of ultra-cold few-atom systems
Quantum enhanced precision measurement
Quantum Monte Carlo simulations of fermionic superfluids
Quantum ratchets with ultracold atomic gases
Relativistic Quantum Chemistry
Solid State Physics
Solitonic Vortices
Spin-dependent parity violation in diatomic molecules
Stochastic Resonance
Strongly correlated fermionic superfluids
Superheavy Element Chemistry
Symmetries and Ratchets
Theoretical Inorganic and Organic Chemistry
Thermodynamics of bulk metals
Theory of functional nanostructures; Spintronics
Topological and Graph Theoretical Aspects of Fullerenes
Transition Metal Catalysis and Theory of Chemical Bonding
Variation of Fundamental Constants in Space-Time
2. PROFESSIONAL LEADERSHIP AND ADMINISTRATION

Honours and Awards:

None in 2018.

Publicity:


– P. Schwerdtfeger gave an interview for the magazine *Nature* on the Periodic Table and Relativistic Effects. One published papers in 2018 on the superheavy element oganesson went into the news world-wide (there are many news items, see for example *ScienceNews* “5 ways the heaviest element on the periodic table is really bizarre”, February 12), and is mentioned in a recent *Nature* article. A New Zealand Herald article appeared January 5 with the headline “Science Made Simple: Peter Schwerdtfeger on chemistry”.

Appendix 4

POST-GRADUATE SUPERVISION

Ongoing PhD Theses:


– Morten Piibeleht (second year): *Relativistic and quantum field theoretic studies of many-body atomic and nuclear systems* (Supervisors: P. Schwerdtfeger, P. Bowman).


Teaching:

- P. Bowman was paper coordinator for 124.226 (Quantum and Statistical Physics) and 124.129 (Astronomy); and taught into 246.102 (Core Skills for Natural Scientists).
- J. Brand is paper coordinator for 124.261 (Nonlinear Physics and Chaos) and also taught into 246.101 (Science and Sustainability).
- P. Jeszenszki was demonstrator at 124.111 (Physics for Life Sciences) labs and 124.261 (Nonlinear Physics and Chaos) labs.
- E. Pahl is paper coordinator of the paper 124.111 – Physics for Life Sciences and taught the first half of this paper. She also taught a three-weeks module on Monte Carlo Methods – 2D Ising Model into the 124.350 Computational Modelling paper and 6 weeks into the second-year paper 124.261 Non-Linear Physics and Chaos.
- M. Raduban was course coordinator for 124.171 and 124.172 (Physical Principles for Engineering and Technology I & II); and taught into 124.111 (Physics for Life Sciences) and 124.100 (Introductory Physics).
- P. Schwerdtfeger gave lecture courses (20 lectures) on Environmental Chemistry within the paper Environmental and Analytical Chemistry 123.206 (semester 1), Introduction to Quantum Theory (20 lectures) for the Advanced Physical and Computational Chemistry paper 123.331 (semester 1).
- O. R. Smits was demonstrator at the 124.129 (Astronomy) and 124.111 (Physics for Life Sciences) labs.
- M. Yang was demonstrator at the 124.172 (Physical Principles for Engineering & Technology 2) lab.

Other activities:

Papers refereed:

- P. Schwerdtfeger refereed in total 35 papers (rejecting now 90% of invitations) from 10 different international journals including Angewandte Chemie, Chem. Commun., Physical Review Letters and J. Am. Chem. Soc., etc.

PhD/MSc and other theses refereed:

- None this year.

Graduate Summer School Organisation:

- J. Brand lectured at the 24th Canberra International Physics Summer School on “Topological Matter”. He also chaired the organizing committee for the Australian and New Zealand Summer School in Ultracold Physics 2019 to be held in January 2019 in Dunedin, NZ.
Conference Organisation:

- P. Schwerdtfeger was part of the organizing committee for the CMMSE2018, 17th International Conference on “Computational and Mathematical Methods in Science and Engineering”, Cadiz (Spain), July 9-14.

Conference Participation:

- See above.

Chairs at Conferences:


Boards / Editorial Boards / Professional Societies / Memberships:

- P. Schwerdtfeger served on the editorial board Molecular Physics, Journal of Computational Chemistry, Computational and Theoretical Chemistry, Fullerenes, Nanotubes and Carbon Nanostructures and Wiley Interdisciplinary Reviews (WIRE): Computational Molecular Science. He also served several on the MU Academic Board and the PBRF panel. He met with members of the International Academy of Quantum Molecular Sciences to select new fellows (Menton, France, June 17-18). He is also the Associate Editor of the newly created Wiley journal

Community Outreach:

- M. Raduban demonstrated physics experiments at Massey University Open Day.

Visits:

- J. Brand stayed with Ali Alavi at the Max-Planck Institute for Solid State Research in Stuttgart, Germany, from to.
- E. Pahl visited the Center for Advanced Study (CAS) in Oslo.
- M. Piibeleht visited L.F.Paštka at Comenius University (Bratislava, Slovakia) and Prof. Per Jönsson at Malmö University (Malmö, Sweden). He also participated in the annual meeting of the Computational Atomic Structure (CompAS) collaboration in Malmö/Lund, Sweden (August 2018).
- M. Raduban visited Prof. Nobuhiko Sarukura at the Institute of Laser Engineering, Osaka University (Osaka, Japan) from April 15–30 and Prof. Dinh Van Trung and Dr. Pham Hong Minh at the Institute of Physics, Vietnam Academy of Science and Technology (Hanoi, Vietnam) from November 10–17.
- P. Schwerdtfeger visited the Institute for Advanced Study (IAS) in Oslo several times in 2018 to undertake research on “Chemistry at Extreme Conditions”.
Exchange Programs:

– J. Brand hosted PhD candidate Christian Baals from the University of Kaiserslautern, Germany, for 3 months.
– P. Schwerdtfeger, E. Pahl, L. Pašteka and K. Steenbergen were part of a successful grant application entitled *Molecules in Extreme Environments* financed by the Norwegian Academy of Science (total of 3.5 million NOK). It has resulted in an active exchange program between the University of Oslo and MU. Starting date was 2017.

Grants Refereed:

– M. Raduban evaluated applications made to the July 2018 Catalyst Seeding funding round for the Royal Society Te Apārangi.
Appendix 4

Financial Statement:

Beside financial support from the College of Sciences through INMS and NZIAS, which covers salaries and administrative support, the following income through internal and external grants was received in 2017 (in NZ$):

External Grants Received/Continuing:

- J. Brand (PI, Marsden grant)  
  $235,000
- J. Brand (PI and Theme leader),  
  CoRE grant of the Dodd Walls Centre.  
  $181,000
- M. Raduban (PI, Osaka University grant;  
  (JPY564,000) $ 8,000
  AI Tohoku University grant)
- P. Schwerdtfeger and E. Pahl (1st year Marsden Fund)  
  $303,333

TOTAL  
$ 827,333
Appendix 5

Staffing

Our research centre (from the left to the right):
Joachim Brand, Lukas Trombach, Oleksandr Fialko, Ashar Malik, Jayson G. Cosme, Jane Allison, Lukas Pašteka, Prof. Nikos Lazarides (Visitor), Andrew Punnet, Lukas Wirz, Sophie Shamailov, Xiaoquan Yu, Joshua Bodyfelt, Elisey Kobzev, Ivan Welsh, Elke Pahl, Carlo Danieli, William Irvine, Ali Alavi (Visitor), Boris Pavlov, Gaven Martin (Head of Institute), Patrick Bowman, Sergej Flach, Boris Altschuler (Visitor), Peter Schwerdtfeger.

Personnel:

Dist. Prof. Peter Schwerdtfeger (Chemistry, Director of CTCP)
Prof. Joachim Brand (Physics, Deputy Director of CTCP)
Dr. Patrick Bowman (Tutor, Physics)
Dr. Elke Pahl (Senior Lecturer, Physics)
Dr. Marilou Raduban (Lecturer, Physics)
Dr. Joshua Bodyfelt (Research Officer)
Prof. Sergej Flach (Honorary Research Fellow, Physics)

Secretaries:

Vesna Davidovic-Alexander (NZIAS)
Annette Warbrooke (INMS)

PhD Students:

Antony Burrows (Supervisors: E. Pahl and P. Schwerdtfeger)
Edison Florez (Supervisors: E. Pahl and P. Schwerdtfeger)
Péter Jeszenszki (Supervisor: J. Brand)
Morten Piibeleht (Supervisors: P. Schwerdtfeger and P. Bowman)
Shamim Shadfar (Supervisors: P. Schwerdtfeger and J.R. Allison)
Odile Smits (Supervisors: E. Pahl and P. Schwerdtfeger)
Lukas Trombach (Supervisors: P. Schwerdtfeger and E. Pahl)
Mingrui (Ray) Yang (Supervisors: J. Brand and E. Pahl)

**Exchange Students:**

None

**Postdoctoral/Research Fellows:**

Dr. Paul Jerabek (Humboldt Feodor-Lynen Fellow)
Dr. Jan Major (Postdoctoral Fellow)
Dr. Jan Mewes (Humboldt Feodor-Lynen Fellow)
Mrs. Stefanie Mewes (Research Fellow)
Dr. Krista Steenbergen (Marsden Postdoctoral Fellow)

**Visitors from other institutions:**

*Long Term (1 month or more):*
Prof. Victor Flambaum (University of New South Wales, Australia)
Prof. Jeff Nagle (Department of Chemistry, Bowdoin College)
Prof. Aleksandr Petrov (Petersburg Nuclear Physics Institute, Russia)
Prof. Sergej Flach (Institute for Basic Science, Daejeon, South Korea)

*Short Term for Talks and Collaborations:*
Dr. Ashton Bradley (Otago University)
Dr. Dmitri Schebarchov (Cambridge University)
Dr. Lars Goerigk (School of Chemistry, University of Melbourne, Australia)
Prof. Leonid Glazman (Department of Physics, Yale University, United States)
Dr. Shih-Chuan (National Changhua University of Education, Physics Department, Taiwan)