NEW ZEALAND SYNCHROTRON GROUP LIMITED



ANNUAL REPORT 2013

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CHAIRMAN'S REPORT

The New Zealand Synchrotron Group Ltd (NZSG) has now completed its seventh year of operation. It marks an important milestone in the evolution of New Zealand's involvement with the Australian Synchrotron with the recent signing of the new agreements that secure the funding and future access rights so that New Zealand researchers can continue to use the facility on the best possible basis. During this period of intense negotiation to obtain the best possible outcome for New Zealand, a full support programme has been maintained.



Access as of right to the state of the art synchrotron in

Melbourne is important to New Zealand's leading scientists dealing with materials of all types. Most of New Zealand's physical exports are agricultural products or materials of one sort or another. There is no alternative technique which provides the same resolution or power to analyse the structure of such materials. Equally synchrotron radiation provides the world's leading scientists in forensics, drug discovery and protein analysis with new opportunities to extend frontier knowledge. The growing number of New Zealand researchers using the facility is testament to its power to create new knowledge at the frontier and the science excellence being achieved across a broadening front of investigation by New Zealand based researchers.

As New Zealand researchers have been routinely receiving over 10-12% of the beamtime under the previous merit and preferred access regimes, the transition to receiving a 5% level will have to be carefully managed. One way in which this will be achieved is through a special feature of the New Zealand access agreement in which the company has the ability to negotiate variable access levels for each beamline (so that more access can be obtained on beamlines more sought after by New Zealand researchers).

With the securing of access rights until 2016, the focus for the board will now shift to how New Zealand can participate in any further capital development of the Synchrotron. Discussions in Australia on expanding the facility by adding new beamlines had been deferred during the re-financing period, but are now being revived. The board would like to ensure that New Zealand researchers can gain similar advantages from access to any new capability.

Full access arrangements for New Zealand researchers to the Australian Synchrotron are now in place for all beamlines, except the imaging and medical beamline where there has only been restricted Preferred Access available. New Zealand researchers have been awarded beamtime through both the Merit and the Preferred Access routes in increasing numbers up until the middle of 2013 when the impact of the new *juste retour* arrangement that will ultimately limit New Zealand's access to 5% of the beamtime began to have an effect. The ongoing support for New Zealand researchers

includes considerable financial support for the costs incurred by researchers in travelling to Melbourne or in shipping samples when using the remote access option.

The company had budgeted for a loss for the year of \$1,206,450 comprising of an expected loss of \$63,700 from trading operations and of \$1,142,750 through the amortisation of the investment in the Australian Synchrotron. The trading result for the year was a loss of \$74,047, a result that was influenced by foreign exchange losses of \$9,870 and costs of \$23,845 for preparing a case to the New Zealand government for future investment in the Australian Synchrotron and negotiating the funding and access rights. After providing for the amortisation costs, the overall result was a loss of \$1,216,795. The value of the shares held in the Australian Synchrotron Holding Company (ASHCo) has now been fully amortised. This is consistent with the imminent cessation of access rights to the original Foundation Investors in the Australian Synchrotron.

The company has no significant sources of revenue, other than funds received from the Australian Synchrotron which provides funding for travel and from interest on funds the company holds. It does, however, have cash reserves in excess of \$200,000. As the company has a more modest balance sheet than in the past, it is not possible to operate at loss, i.e. to utilise shareholders funds to operate the company. Those shareholders that are participating in the new funding and access arrangements have agreed to make an increased level of contribution towards the company's operating costs and it is expected that this will be supplemented by funds from external sources so that an increased level of support can be provided to researchers who are using synchrotrons elsewhere in situations where the Australian Synchrotron does not have the required capability.

The board has been very well supported by the Royal Society of New Zealand who provide secretariat services to NZSG. In particular, I would like to acknowledge the contribution make by Dr Don Smith in assisting the board, administering the New Zealand Synchrotron Support Programme and negotiating the funding and access agreements. I would also like to acknowledge the contribution from the Chair of the Access Committee, Professor Geoff Jameson and especially its retiring members Dr Graeme Gainsford, Associate Professor Mike Reid and Associate Professor Metcalf who have evaluated all requests for preferred access and for funding support for training.

Finally, I would like to thank my fellow directors, Dr Desmond Darby and Professors Geoff Jameson, Jim Metson and Ian Shaw.

J. 9. Carnaby

GA Carnaby Chair

BUSINESS REVIEW

Investment in the Australian Synchrotron and Ongoing Access Rights

Through the original investment in the Australian Synchrotron in October 2007, NZSG has been a member of the Australian Synchrotron Company (ASC) and a shareholder in the Australian Synchrotron Holding Company (ASHCo). As part of the restructuring of the Australian Synchrotron operations and funding, the responsibility for operating the Synchrotron was transferred from ASCo to a new entity, the Synchrotron Light Source Australian Pty Ltd (SLSA) on 1 January 2013. As a consequence, ASCo was deregistered in June 2013. NZSG remains a shareholder in ASHCo which has leased the facility and equipment to SLSA to operate. The 5 million A\$1 shares in ASHCo held by NZSG are fully paid, however their value has been progressively written down to zero as at 30 June 2013 to reflect the cessation of access rights to all foundation investors in the Australian Synchrotron after August 2013.

During 2012 discussions were held between the Victorian State government and the Commonwealth government regarding the future funding of the operating costs for the Synchrotron. NZSG and the other foundation investors were involved in those discussions. The outcome was that the Commonwealth government would take an increased role in providing operating funding for the facility and a structure was established under which the facility was leased to SLSA, a subsidiary of the Australian Nuclear Science and Technology Organisation, which became the new operator with effect from 1 January 2013. An operating funding package of A\$100 million over four years from 1 July 2012 to 30 June 2016 was negotiated with most of the funding being provided by both the Australian research sector and the Victorian State and Commonwealth governments. New Zealand was invited to participate in this arrangement and NZSG has agreed to provide 5% of the operating funds in return for 5% of the future access.

In parallel with the discussions in Australia, the existing NZSG shareholders were offered the opportunity to continue providing operating funds and secure future access for their research personnel. In January 2013 an investment case was submitted to the New Zealand government for complementary funding. Eight shareholding institutions agreed to provide funding and the agreements establishing the future funding and access arrangements for New Zealand until 30 June 2016 were signed in July 2013. The research sector will provide A\$1.96 million and the government A\$2.21 million funding towards the Synchrotron's operating costs over the next three years.

A payment of A\$839,458, being the final payment of the New Zealand contribution towards the operating costs of the Synchrotron under the original Subscription Agreement was made on 28 February 2013.

Although the Synchrotron is now operated by an entity independent of the original foundation investors, its operations are governed by an Operating Services Agreement

with ASHCo under which a Funders Committee was established to advise the board of SLSA and to have oversight of the Synchrotron's operations, budget and development. The NZSG board has appointed Dr Don Smith to be the company's representative on the Funders Committee. He is also the company's representative at meetings of the shareholders of ASHCo. He attended the annual general meetings of ASCo and ASHCo in October 2012 and has participated in the discussions with Australian governmental agencies and other funding parties on the future funding and access arrangements for the Synchrotron. Dr Smith is also the contact person for day-to-day matters associated with access arrangements and user liaison with SLSA.

Decisions on Access and Funding Support

In 2007 the Board established an Access Committee to make the decisions on applications for preferred time access, funding for synchrotron science or funding support for the costs of travel to synchrotrons. The members of the Committee were:

Professor Geoff Jameson, Massey University (Chair) Dr Graeme Gainsford, Industrial Research Ltd Associate Professor Peter Metcalf, University of Auckland Associate Professor Mike Reid, University of Canterbury

The Committee did not met during the year formally as a group but the individual members have communicated throughout the year on proposals they have been asked to assess. The criteria for selecting proposals were developed and approved by shareholders and is published on the NZSG web site along with other information on accessing support.

With the cessation of the preferred access scheme for Foundation Investors from September 2013 onwards, the committee's focus has changed to providing an input into the ranking of merit proposals by New Zealand researchers. Three of the members retired in June 2013 and three new members were appointed.

The new committee consists of:

Professor Geoff Jameson, Massey University (Chair) Professor Vic Arcus, University of Waikato Dr Vladimir Golovko, University of Canterbury Dr Geoff Waterhouse, University of Auckland

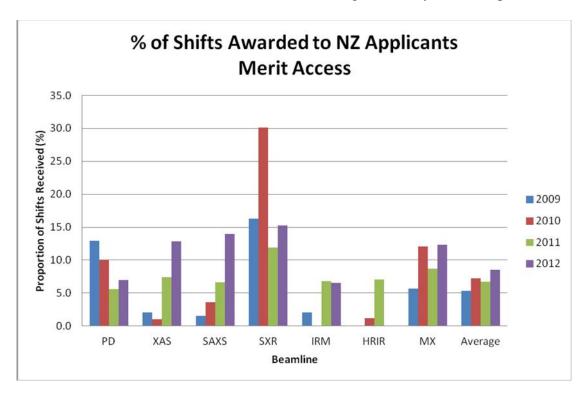
The table at the end of this section lists the New Zealand researchers who have gained beamline access to the Australian Synchrotron from July 2012 onwards, and where applicable, the funding support provided to them.

Use of the Australian Synchrotron by New Zealand Researchers

The first of the beamlines was successfully commissioned in mid 2007 and since then all of the originally planned beamlines have become operational. The last of them, the Imaging and Medical Beamline, has only been available for merit access and for limited preferred access supporting commissioning this past year. Approximately 50% of the available beamline time is assigned to "merit" access and competitive applications are sought from researchers worldwide, including from New Zealand. The Australian Synchrotron makes calls every four months for merit access to the beamlines. Applications are made directly to the Australian Synchrotron with no direct involvement from NZSG apart from promoting the opportunity to apply via our website.

Since late 2008, in recognition of the contribution New Zealand makes to operating costs, the Australian Synchrotron began contributing towards the travel costs for New Zealand researchers who obtained beamtime at the Australian Synchrotron on an equal basis with Australian researchers. These funds are administered through NZSG.

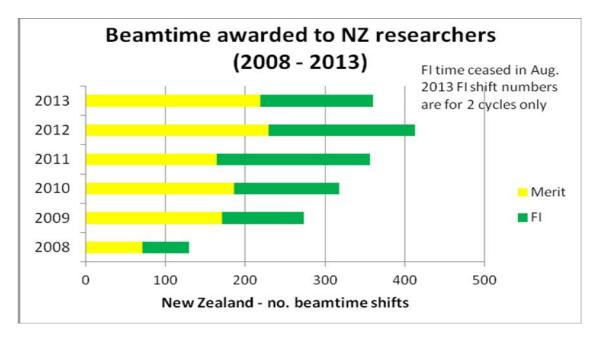
New Zealand researchers have applied for time on all the available beamlines with success as shown in the following graph. Although success rates fluctuate from round to round, applications from New Zealand research groups match well with those from elsewhere. The original target established with the view that the New Zealand research community were on the whole not established synchrotron users was to reach 5% of the merit time. The graph shows that this has been surpassed. For all of 2012 the proportion achieved was 8.5%. In the first cycle of 2013 (not shown on the graph, the figure was 12.5%, however this means of comparison will not be useful from now on as New Zealand's share of the merit time will be governed by the 5% cap.



In addition to the awards of merit time, approximately 4.5% of the beamtime has been available for allocation by NZSG as "Preferred Access" (or Foundation Investor Access). Approximately 30% of the available beamline time is set aside explicitly for researchers from the ten Foundation Investors. This arrangement bypasses the "merit" process and ensures that researchers who did not obtain or apply for merit access can gain access directly as a result of their institution being a Foundation Investor. The provision of Foundation Investor time will cease in August 2013 when the obligation to make payments towards the Australian Synchrotron's operating costs expires. Researchers from the company's shareholding institutions apply through NZSG for

access to New Zealand's Foundation Investor time and their proposals are evaluated by an Assessment Committee.

One of NZSG's goals has been to ensure that full use is made of the Foundation Investor time. This is very important as the competition for merit time becomes more intense. The following graph demonstrates the growth in the number of beamline shifts that have been awarded to New Zealand researchers since 2008. In the past year, 95% of all the beamline time available to New Zealand as Foundation Investor time was utilised.



There has been a corresponding growth in the number of New Zealand research groups using the Australian Synchrotron up until 2013 as shown in the following table. The figures for 2013 are lower as the number of merit awards was constrained to reflect the fact that New Zealand researchers would be getting 5% of the beamtime from 2013 onwards and the awarding of FI time ceased after the 2013/2 cycle.

Number of NZ groups with scheduled time (merit and preferred) at the AS

Beamline \ Period	2008	2009	2010	2011	2012	2013
Imaging and Medical						5
Protein Crystallography (MX1 and MX2)	3	7	19	29	41	36
Infrared Microscopy and High Resolution IR	3	2	3	4	7	7
Powder Diffraction	8	10	11	10	6	4
Soft X-ray Spectroscopy	1	7	9	7	10	4
Small & Wide Angle X-ray Scattering		4	7	9	20	12
X-ray Fluorescence Microscopy		2	1	3	3	1
X-ray Absorption Spectroscopy		3	3	3	8	6
Total	15	35	53	65	95	75

Support for Synchrotron Scientists

Until 30 June 2009, the company operated the New Zealand Synchrotron Support Programme (NZSSP) with funds originating from the Tertiary Education Commission. With the cessation of that funding, the formal NZSSP has scaled down, but in a large part has been replaced by travel funding available from the Australian Synchrotron which most groups which are granted merit or Foundation Investor access are entitled. The NZSG administers these funds.

Some opportunities still exist for the company to support the development of synchrotron science capability in students and postdoctoral researchers. In addition to funding a number of them to travel to Melbourne to use the Australian Synchrotron, through the associate membership of the Asia Oceania Forum for Synchrotron Radiation Research (AOFSRR), two places are made available each year for students to attend the Cheiron School at the SPring-8 Synchrotron in Japan. The offer of places includes full funding for travel and accommodation. In addition, extra places for self-funded students are also available.

The table below provides details of the students who attended in September/October 2012.

Name	Institution	Details	Comment
Hanan Kayed	Massey University	PhD student	Fully funded
Vedran Jovic	University of Auckland	PhD student	Fully funded
Richard Souness	University of Otago	PhD student	Self-funded
Nellie Olsen	Victoria University of Wellington	PhD student	Self-funded
Daniil Ovoshchnikov	University of Canterbury	PhD student	Self-funded
Seong Joo Nam	University of Auckland	PhD student	Self-funded

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D K W Smith Executive Officer Secretariat

New Zealand Research Groups Awarded Beamtime (July 2012 – June 2013)

The following New Zealand research groups were awarded time (merit and preferred) at the Australian Synchrotron between July 2012 and June 2013.

Researchers	Institution	Cycle	Beamline	Access
A/P Emily Parker Dr Grant Pearce Dr Renwick Dobson Ali Reza Nazmi Sebastian Reichau Dr Jo Hobbs Emma Andrews	Canterbury Canterbury Canterbury Canterbury Canterbury Waikato Waikato	2012-2	Macromolecular Crystallography (MX1) "Biomolecular Interaction Centre, University of Canterbury" (Note: Canterbury did not need the time on 28-29 July so arranged for it to be used by their collaborators at Waikato)	Merit Access 2 days 4-5 July, and 28-29 July
Dr Renwick Dobson Michael Griffin Elena Sugrue Rachel North Hironori Suzuki	Canterbury Melb. Univ. Canterbury Canterbury	2012-2	Micro Crystallography (MX2) "Melbourne University, Bio21 Institute Time, MX Beam-lines"	Melb. Univ time 2 days 27-28 July 26-27 Aug
Dr Shaun Lott Prof Ted Baker Dr Christian Link Dr Genevieve Evans Dr Paul Young Jason Busby	Auckland Auckland Auckland Auckland Auckland Auckland	2012-2	Macromolecular Crystallography (MX1) "Mycobacterium tuberculosis: Structural biology and drug discovery."	Preferred Access 1 day 1-2 August
Dr Chris Daughney Dr Bernt Johannessen Dr Peter Swedlund Dr Sarah Harmer Dr Chris Weisener	GNS Science Aust. Synch Auckland Flinders U Windsor U, Canada	2012-2	X-ray Absorption Spectroscopy (XAS) "Redox interactions between co- adsorbed copper and iron on bacterial surfaces I: Cu K-edge EXAFS"	Merit Access 2 days 4-6 August
Prof Kurt Krause Dr Sigurd Wilbanks Dr Sylvia Luckner Dr Karen Knapp	Otago Otago Otago Otago	2012-2	Micro Crystallography (MX2) "University of Otago Structural Biology Group"	Preferred Access 2 days 10-11 August 22-23 August
A/P Emily Parker Dr Celine Valery Prof Geoff Jameson Prof Juliet Gerard Dr Grant Pearce Dr Renwick Dobson Ali Reza Nazmi Sebastian Reichau Dmitri Joseph	Canterbury Canterbury Massey Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2012-2	Micro Crystallography (MX2) "Biomolecular Interaction Centre, University of Canterbury"	Preferred Access 1 day 11-12 August

Researchers	Institution	Cycle	Beamline	Access
Dr Grant Pearce Amy Phillips Jeremy Keown Akshita Wason Dr Celine Valery Dr Penel Cross Francesca Manea	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Macquarie U.	2012-2	Small/Wide Angle X-ray Scattering (SAXS) "Solution Structure Studies of Dihydrodipicolinate Reductase"	Merit Access 1 day 16-17 August
Felix von Aulock Dr Ben Kennedy Prof Shane Cronin Dr Christopher Oze Paul Ashwell	Canterbury Canterbury Massey Canterbury Canterbury	2012-2	Infrared Microscopy (IRM) "Water distribution in collapsing foams of magma"	Merit Access 4 days 16-20 August
Dr Shaun Lott Prof Ted Baker Dr Christian Link Dr Genevieve Evans Jason Busby	Auckland Auckland Auckland Auckland Auckland	2012-2	Macromolecular Crystallography (MX1) "Mycobacterium tuberculosis: Structural biology and drug discovery."	Merit Access 1 day 17-18 August
Dr Grant Pearce Amy Phillips Jeremy Keown Akshita Wason Dr Celine Valery Dr Penel Cross Francesca Manea	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Macquarie U.	2012-2	Small/Wide Angle X-ray Scattering (SAXS) "Solution Structure Studies of Rubisco and Rubisco Activase"	Merit Access 1 day 17-18 August
Dr Renwick Dobson Dr Michael Griffin Dr James Murphy Hironori Suzuki Katerine Donovan	Canterbury Melbourne U. WEHI. Canterbury Canterbury	2012-2	Small/Wide Angle X-ray Scattering (SAXS)	WEHI Merit Access 18 August
Dr Grant Pearce A/PEmily Parker Prof Juliet Gerrard Dr Renwick Dobson Moritz Lasse	Canterbury Canterbury Canterbury Canterbury Canterbury	2012-2	Small/Wide Angle X-ray Scattering (SAXS) "Biomolecular Interaction Centre, University of Canterbury"	Preferred Access 1 day 19-20 August
Prof Richard Haverkamp Anne Anderson Christian Dimkpa David Britt Joan Mclean Katie Sizeland	Massey Utah S Utah S Utah S Utah S Massey	2012-2	X-ray Absorption Spectroscopy (XAS) "Bioaccumulated silver in wheat shoots (AS)"	Merit Access 2 days 22-24 August
Dr Chris Squire Prof Ted Baker Dr Liam O'Ryan Michael Herbert Hanna Kwon	Auckland Auckland Auckland Auckland Auckland	2012-2	Small/Wide Angle X-ray Scattering (SAXS) "Unbiquitination, OV008/Skp1, and an insect cytotoxin complex"	Merit Access 1 day 24-25 August
Dr Shaun Lott Prof Ted Baker Dr Chris Squire Jason Busby James Jung Hanna Kwon Neil Paterson	Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2012-3	Macromolecular Crystallography (MX1) "Structure-based inhibitor design"	Merit Access 2 days 14-15 September 17-18 October

Researchers	Institution	Cycle	Beamline	Access
Assoc Prof Emily Parker Dr Ali Reza Nazmi Sebastian Reichau Prof Geoff Jameson Dr Renwick Dobson Dmitri Josef Dr Wanting Jiao	Canterbury Canterbury Canterbury Massey Canterbury Canterbury Canterbury	2012-3	Macromolecular Crystallography (MX1) "Inhibition and allostery of essential bacterial metabolism"	Merit Access 1 day 26-27 September
Assoc Prof Emily Parker Prof Juliet Gerard Dr Ali Reza Nazmi Dr Grant Pearce Dr Renwick Dobson Penelope Cross Sebastian Reichau Sarah Wilson-Coutts Jeremy Keown	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-3	Small/Wide Angle X-ray Scattering (SAXS) "Allosteric control of aromatic amino acid biosynthesis: Complex formation and conformational changes"	Merit Access 1 day 28-29 September
Assoc Prof Vic Arcus Emma Summers Dr Jo Hobbs Dr Judith Burrows Tifany Oulavallickal	Waikato Waikato Waikato Waikato Waikato	2012-3	Macromolecular Crystallography (MX1) "Proteins from Mycobacteria and Bacillus"	Merit Access 1 day 28-29 September
Assoc Prof Emily Parker Prof Juliet Gerard Sebastian Reichau Gerd Mittelstaedt Dr Grant Pearce Dr Renwick Dobson Dr Ali Reza Nazmi Penelope Cross	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2012-3	Small/Wide Angle X-ray Scattering (SAXS) "Regulation and solution structure changes in enzymes of histidine and leucine biosynthesis"	Preferred Access 1 day 29-30 September
Professor Ted Baker Dr Chris Squire Dr Neil Paterson Dr Shaun Lott Dr Paul Young Yuliana Yosaatmadja	Auckland Auckland Auckland Auckland Auckland Auckland	2012-3	Micro Crystallography (MX2) "Molecular basis of microbial pathogenesis"	Merit Access 2 days 29-30 September 3-11 November
Dr Grant Pearce Assoc Prof Emily Parker Prof Juliet Gerard Dr Renwick Dobson Amy Phillips Penel Cross	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2012-3	Small/Wide Angle X-ray Scattering (SAXS) "Biomolecular Interaction Centre, University of Canterbury"	Preferred Access 1 day 4-5 October
Dr Renwick Dobson Dr James Murphy Dr Michael Griffin Arvind Ravichandran Rachel North	Canterbury WEHI Melbourne U. Canterbury Canterbury	2012-3	Small/Wide Angle X-ray Scattering (SAXS)	WEHI Merit Access 1 day 5-6 October

Researchers	Institution	Cycle	Beamline	Access
Dr Grant Pearce Prof Juliet Gerrard Dr Renwick Dobson Bridget Mabbutt Francesca Manea	Canterbury Canterbury Canterbury Macquarie U. Macquarie U.	2012-3	Small/Wide Angle X-ray Scattering (SAXS) "Characterization of Ring Shaped Protein Complexes"	Merit Access 1 day 6-7 October
Prof Geoff Jameson Prof Richard Haverkamp Eric Ainscough Harjinder Singh Devastotra Poddar Dr Ashling Ellis Katie Sizeland	Massey Massey Massey Massey Massey Massey	2012-3	X-ray Absorption Spectroscopy (XAS) "Characterization of speciation of manganese in probiotic Lactobacillus paracasei"	Preferred Access 2 days 9-11 October
Dr Renwick Dobson Dr Michael Griffin Dr Sarah Kessans Dr Hironori Suzuki	Canterbury Melbourne U. Canterbury Canterbury	2012-3	Micro Crystallography (MX2)	Melbourne Univ Merit Time 1 day 11-12 October
Prof Geoff Jameson Prof Richard Haverkamp Eric Ainscough Harjinder Singh Devastotra Poddar Dr Ashling Ellis Katie Sizeland	Massey Massey Massey Massey Massey Massey Massey	2012-3	X-ray Absorption Spectroscopy (XAS) "Characterization of speciation of manganese in probiotic Lactobacillus paracasei"	Merit Access 2 days 11-13 October
Assoc Prof Emily Parker Celine Valery Prof Geoff Jameson Prof Juliet Gerard Ali Reza Namzi Dr Grant Pearce Dr Renwick Dobson Sebastian Reichau	Canterbury Massey Canterbury Canterbury Canterbury Canterbury Canterbury	2012-3	Micro Crystallography (MX2) "Biomolecular Interaction Centre, University of Canterbury, Protein structure determination"	Preferred Access 1 day 20-21 October
Dr Simon Hinkley Dr Bridget Ingham Cameron Tristram	IRL	2012-3	Small/Wide Angle X-ray Scattering (SAXS) "Amorphous state changes of a novel series of polymeric materials"	Preferred Access 1 day 24-25 October
Prof Kurt Krause Sigurd Wilbanks Sylvia Luckner Karen Knapp	Otago	2012-3	Micro Crystallography (MX2) "University of Otago Structural Biology Group"	Preferred Access 1 day 26-27 October
Andreas Auer Dr Marco Billia A/P James White Dr Jan Scholz Prof Keith Gordon	Otago Otago Otago Otago Otago	2012-3	Infrared Microscopy (IRM) "Determination of volatile contents in volcanic silicate rock samples"	Preferred Access 2 days 31 Oct - 2 Nov
Dr Chris Squire Michael Herbert Prof Ted Baker Dr Ghader Bashiri	Auckland Auckland Auckland Auckland	2012-3	Small/Wide Angle X-ray Scattering (SAXS) "How does the poxvirus orf hijack ubiquitination?"	Merit Access 1 day 7-8 November

Researchers	Institution	Cycle	Beamline	Access
Prof Kurt Krause Sigurd Wilbanks Sylvia Luckner Karen Knapp	Otago Otago Otago Otago	2012-3	Macromolecular Crystallography (MX1) "University of Otago Structural Biology Group"	Merit Access 1 day 16-17 November
Assoc Prof Emily Parker Gerd Mittelstaedt	Canterbury Canterbury	2012-3	Macromolecular Crystallography (MX1) Biomolecular Interaction Centre University of Canterbury - Inhibition and allostery of essential bacterial metabolism	Merit Access 1 day 21 November
Assoc Prof Vic Arcus Emma Summers Dr Jo Hobbs Dr Judith Burrows	Waikato Waikato Waikato Waikato	2012-3	Macromolecular Crystallography (MX1) "Proteins from Mycobacteria and Bacillus"	Preferred Access 1 day 23-24 November
Dr Vince Carbone Dr Ron Ronimus Dr Linley Schofield Dr Yanli Zhang Debjit Dey Carrie Sang	AgResearch AgResearch AgResearch AgResearch AgResearch AgResearch	2012-3	Micro Crystallography (MX2) "Structural characterisation of methanogen and archaeal- specific enzymes"	Preferred Access 1 day 25-26 November
Professor Ted Baker Dr Chris Squire Dr Neil Paterson Dr Shaun Lott	Auckland Auckland Auckland Auckland	2012-3	Macromolecular Crystallography (MX1) "Molecular basis of microbial pathogenesis"	Preferred Access 1 day 26-27 November
Dr Qinfen Gu Dr Yacine Hemar	Aust. Synch. Auckland	2012-3	Powder Diffraction (PD)	Aust Synch Time 26-27 November
Assoc Prof Emily Parker Dr Ali Reza Nazmi Sebastian Reichau Prof Geoff Jameson Dr Renwick Dobson	Canterbury Canterbury Canterbury Massey Canterbury	2012-3	Macromolecular Crystallography (MX1) "Inhibition and allostery of essential bacterial metabolism"	Merit Access 1 day 27-28 November
Prof Geoff Jameson Eric Anscough Prof Richard Haverkamp	Massey Massey Massey	2012-3	X-ray Fluorescence Microscopy (XFM) "Characterization of Cellular Distribution of Metals and Concentration Gradients of Manganese in Probiotic Lactobacillus paracasei 431"	Preferred Access 2 days 4-6 December
Dr Peng Cao Saifang Huang Prof Wei Gao Gang Chen Xin Ouyang	Auckland Auckland Auckland Auckland Auckland	2012-3	Powder Diffraction (PD) "High temperature in situ observation of nucleation and crystallization of lithium disilicate glasses"	Merit Access 1 day 5-6 December
Dr Peng Cao Saifang Huang Prof Wei Gao Gang Chen Xin Ouyang	Auckland Auckland Auckland Auckland Auckland	2012-3	Powder Diffraction (PD) "High temperature in situ observation of nucleation and crystallization of lithium disilicate glasses"	Preferred Access 3 days 6-9 December

Researchers	Institution	Cycle	Beamline	Access
Michel Nieuwoudt Dr Mark Simpson Dr Jeff Mauk James Conway Prof Robert Bodnar	Auckland Auckland Auckland Auckland Virginia Tech	2012-3	X-ray Fluorescence Microscopy (XFM) "Synchrotron FTIR microscopy of CO2 in the gas and liquid phases in a set of synthetic H2O- CO2 fluid inclusions having different but known CO2 concentrations"	Merit Access 2 days 11-13 December
Dr Renwick Dobson Dr Michael Griffin Dr Sarah Kessans Dr Hironori Suzuki	Canterbury Melbourne U. Canterbury Canterbury	2012-3	Micro Crystallography (MX2)	Melbourne Univ Merit Time 1 day 12-13 December
Dr Greg Giles Emily Shearer Dr James Crowley	Otago Otago Otago	2013-3	X-ray Fluorescence Microscopy (XFM) "Metallosupramolecular Cages for Drug Delivery"	Preferred Access 2 days 12-14 December
Michel Nieuwoudt Dr Mark Simpson Dr Jeff Mauk James Conway Prof Robert Bodnar	Auckland Auckland Auckland Auckland Virginia Tech	2012-3	X-ray Fluorescence Microscopy (XFM) "Synchrotron FTIR microscopy of CO2 in the gas and liquid phases in a set of synthetic H2O- CO2 fluid inclusions having different but known CO2 concentrations"	Preferred Access 1 day 13-14 December
Dr Geoff Waterhouse Zakiya Al-Azri Wan-Ting Chen Andrew Chan Harpreet Chahal Rayomand Shahlori	Auckland Auckland Auckland Auckland Auckland Auckland	2013-1	Soft X-ray Spectroscopy (SXR) "Electronic structure of CuOx/TiO ₂ and Au- RuOx/TiO ₂ photocatalysts for water splitting"	Merit Access 5 days 5-10 February
Assoc Prof Emily Parker Prof Geoff Jameson Dr Ali Reza Nazmi Sebastian Reichau Gerd Mittelstaedt Gerard Moggre Dr Penelope Cross	Canterbury Massey Canterbury Canterbury Canterbury Canterbury Canterbury	2013-1	Macromolecular Crystallography (MX1) "Inhibition and allostery of essential bacterial metabolism"	Merit Access 2 days 7-8 February 14-15 April
Dr Chuong Nguyen Prof Jim Metson Francis Goh Jerome Leveneur Yantao Song Lewis Hensman	Auckland Auckland Auckland GNS Science Auckland GNS Science	2013-1	Soft X-ray Spectroscopy (SXR) "Investigation of the extent of ion-induced reduction of metal oxides by energy resolved XPS and XANES"	Preferred Access 3 days 12-15 February
Dr Chris Squire Prof Ted Baker Dr Shaun Lott Dr Ghader Bashiri Hanna Kwon Dr Neil Paterson Dr Paul Young	Auckland Auckland Auckland Auckland Auckland Auckland	2013-1	Micro Crystallography (MX2) "Structural and molecular basis of microbial pathogenesis"	Merit Access 1 day 12-13 February

Researchers	Institution	Cycle	Beamline	Access
Dr Renwick Dobson Dr Michael Griffin Dr James Murphy Katerine Donovan	Canterbury Melbourne U Melbourne U Canterbury	2013-1	Micro Crystallography (MX2)	Melbourne Uni. Merit Access 1 day 15-16 February
Dr Liam O'Ryan Assoc Prof Alok Mitra Dr Chris Squire Mike Herbert	Auckland Auckland Auckland Auckland	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Investigation of the structure of bacterial integral membrane mercury transport protein MerT in solution"	Preferred Access 1 day 16-17 February
Prof Kurt Krause Dr Sigurd Wilbanks Dr Sylvia Luckner Dr Karen Knapp Prof Catherine Day	Otago Otago Otago Otago Otago	2013-1	Macromolecular Crystallography (MX1) "University of Otago Structural Biology Group"	Merit Access 2 days 21-22 February 26-27 March
Dr Michael Mucalo Dr Bridget Ingham Kethsiri Lokuliyanage	Waikato IRL Waikato	2013-1	X-ray Absorption Spectroscopy (XAS) "EXAFS of Ni(II)-, Cu(II)- and Au(I)-pseudohalide complexes in polar aprotic solvent (DMSO)"	Preferred Access 2 days 27 Feb-1 March
Dr Renwick Dobson Dr Michael Griffin Dr James Murphy	Canterbury Melbourne U Melbourne U	2013-1	Macromolecular Crystallography (MX1)	Melbourne Uni Preferred Access 2 days 1-2 March 23-24 April
Dr Ben Ruck James McNulty Prof Joe Trodahl Prof Walter Lambrecht Dr Eva-Maria Anton Harry Warring	Victoria Victoria Victoria Case Western Victoria Victoria	2013-1	Soft X-ray Spectroscopy (SXR) "Soft x-ray spectroscopy of in- situ grown SmN and EuN"	Merit Access 5 days 5-10 March
Dr Ren Dobson Dr Michael Griffin Dr James Murphy Dr Sarah Kessans Jeremy Keown	Canterbury WEHI WEHI Canterbury Canterbury	2013-1	Small/Wide Angle X-ray Scattering (SAXS)	WEHI Merit Access 1 day 6-7 March
Dr Tilo Soehnel Daniel Wilson Hyung-Been Kang	Auckland Auckland Auckland	2013-1	Powder Diffraction (PD) "Structural studies on transition metal doped copper antimony"	Preferred Access 2 days 8-10 March
Prof Kurt Krause Dr Sigurd Wilbanks Dr Sylvia Luckner Dr Karen Knapp Prof Catherine Day Dr Adam Heikal Dr Yoshio Nakatani Dr Adam Middleton	Otago Otago Otago Otago Otago Otago Otago Otago	2013-1	Micro Crystallography (MX2) "University of Otago Structural Biology Group"	Merit Access 1 day 8-9 March

Researchers	Institution	Cycle	Beamline	Access
Assoc Prof Emily Parker Dr Celine Valery Prof Geoff Jameson Prof Juliet Gerard Dr Ali Reza Nazmi Dr Grant Pearce Dr Renwick Dobson Sebastian Reichau Dmitri Joseph Nicola Blackmore	Canterbury Canterbury Massey Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-1	Micro Crystallography (MX2) "Biomolecular Interaction Centre, University of Canterbury, Protein structure determination"	Preferred Access 1 day 9-10 March
Dr Renwick Dobson Dr Michael Griffin Dr James Murphy Dr Hironori Suzuki Dr Muge Kasanmascheff Arvind Ravichandra Dr Sarah Kessans	Canterbury Melbourne U Melbourne U Canterbury Canterbury Canterbury Canterbury	2013-1	Micro Crystallography (MX2)	Melbourne Uni Preferred Access 3 days 15-16 March 10-11 April 3-4 May
Dr Natalia Pardo Prof Shane Cronin Dr Heather Wright Dr Ben Kennedy Dr Ian Smith Rafael Torres	Massey Massey USGS Canterbury Auckland Massey	2013-1	Imaging and Medical (IM) "Reconstructing magma degassing rocesses from 3D pumice textures"	Merit Access 2 days 19-21 March (transferred to 24-26 August)
Dr Steve Wakelin Prof Enzo Lombi Dr Erica Donner	AgResearch Univ Sth Aust Univ Sth Aust	2013-1	X-ray Absorption Spectroscopy (XAS) "Speciation and bio-availability of nanoparticulate copper in soil"	Preferred Access 1 day 19-20 March
Dr Steve Wakelin Prof Enzo Lombi Dr Erica Donner	AgResearch Univ Sth Aust Univ Sth Aust	2013-1	X-ray Absorption Spectroscopy (XAS) "Speciation and bio-availability of nanoparticulate copper in soil"	Merit Access 1 day 20-21 March
Dr Vladimir Golovko Dr Aaron Marshall Campbell McNicoll Jan-Yves Ruzicka Faridah Abu Bakar Jared Steven Dr John Kennedy Dr Tim Kemmitt Campbell McNicoll	Canterbury Canterbury Canterbury Canterbury Canterbury GNS Science Callaghan Callaghan	2013-1	Powder Diffraction (PD) "Particle size determination using Synchrotron Powder Diffraction for accurate structure-property correlations"	Preferred Access 1 day 20-21 March
Dr Ben Kennedy Matt Edwards Paul Ashwell Felix von Aulock Prof Shane Cronin Dr Natalia Pardo	Canterbury Canterbury Canterbury Canterbury Massey Massey	2013-1	Imaging and Medical (IM) "Bubble collapse in experimental samples representative of volcanic plugs"	Merit Access 2 days 21-23 March (transferred to 26-28 August)

Researchers	Institution	Cycle	Beamline	Access
Dr Chris Squire Prof Ted Baker Dr Shaun Lott Ghader Bashiri Hanna Kwon Neil Paterson Paul Young Thomas Lagautriere Hanna Kwon	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2013-1	Macromolecular Crystallography (MX1) "Structural and molecular basis of microbial pathogenesis"	Merit Access 1 day 22-23 March
Dr Chris Squire Prof Ted Baker Dr Shaun Lott Ghader Bashiri Hanna Kwon Neil Paterson Paul Young	Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2013-1	Macromolecular Crystallography (MX1) "Structural and molecular basis of microbial pathogenesis"	Preferred Access 1 day 5-6 April
Dr Bridget Ingham Dr Alistair Carr Gad Erlangga Dr Nigel Kirby	IRL Massey Massey Aust. Synch.	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Using a- SAXS to study Fe-fortification of milk"	Merit Access 3 days 11-14 April
Dr Bridget Ingham Dr Tim Kemmitt	IRL IRL	2013-1	Soft X-ray Spectroscopy (SXR) "Determining the location of Al in Al:ZnO films"	Preferred Access 3 days 17-20 April
Dr Celine Valery Prof Juliet Gerard Dr Renwick Dobson Deepti Mahapatra	Canterbury Canterbury Canterbury Canterbury	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Nanostructures by short biomimetic self-assembling peptides: high throughput study of molecular packing in the hydrated state"	Preferred Access 1 day 18-19 April
Dr Chris Squire Prof Ted Baker Dr Shaun Lott Ghader Bashiri Hanna Kwon Neil Paterson Paul Young Dr Genevieve Evans	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2013-1	Micro Crystallography (MX2) "Structural and molecular basis of microbial pathogenesis"	Preferred Access 1 day 23-24 April
Dr Grant Pearce Assoc Prof Emily Parker Prof Juliet Gerard Dr Renwick Dobson Hironui Suzuki Jeremy Keown Francesca Manea	Canterbury Canterbury Canterbury Canterbury Canterbury Macquarie U	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Biomolecular Interaction Centre, University of Canterbury"	Preferred Access 1 day 23-24 April

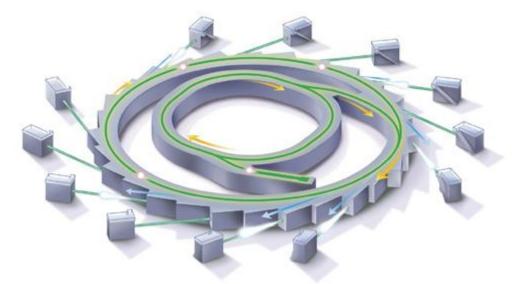
Researchers	Institution	Cycle	Beamline	Access
Assoc Prof Emily Parker Ali Reza Nazmi Dr Grant Pearce Penelope Cross Dr Renwick Dobson Penelope Cross Nicola Blackmore Moritz Lasse	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Allosteric control of aromatic amino acid biosynthesis: Complex formation and conformational changes"	Merit Access 1 day 24-25 April
Dr Grant Pearce Assoc Prof Bridget Mabbut Dr Renwick Dobson Dr Celine Valery Prof Juliet Gerard Prof Peter Steel Amy Yewdall Francesca Manea	Canterbury Macquarie U. Canterbury Canterbury Canterbury Canterbury Canterbury Macquarie U.	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Characterization of Ring Shaped Protein Complexes"	Merit Access 1 day 25-26 April
Assoc Prof Emily Parker Prof Juliet Gerard Sebastian Reichau Gerd Mittelstaedt Dr Grant Pearce Dr Renwick Dobson Ali Reza Namzi Penelope Cross Emma Livingstone	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-1	Small/Wide Angle X-ray Scattering (SAXS) "Regulation and solution structure changes in enzymes of histidine and leucine biosynthesis"	Merit Access 1 day 26-27 April
Prof Wei Gao Xiaojin Wei Saifang Huang Zhendi Yang Dr Filipa Silva Dr. Xue-xian Zhang	Auckland Auckland Auckland Auckland Auckland Massey	2013-1	Infrared Microscope (IRM) "In situ investigation of the impact of metallic copper on bacterial membrane using synchrotron FTIR spectro- microscopy"	Preferred Access 3 days 26-29 April
Prof Kurt Krause Dr Sigurd Wilbanks Dr Sylvia Luckner Dr Karen Knapp Dr Adam Heikal Dr Yoshio Nakatani	Otago Otago Otago Otago Otago Otago	2013-1	Micro Crystallography (MX2) "University of Otago Structural Biology Group"	Preferred Access 1 day 27-28 April
Dr Ben Kennedy Dr Felix von Aulock	Canterbury Canterbury	2013-1	Infrared Microscope (IRM) "Toward an integrated model of water diffusion and bubble deformation"	Merit Access 5 days 30 Apr-5 May
Prof Kurt Krause Dr Sigurd Wilbanks Dr Sylvia Luckner Dr Karen Knapp	Otago Otago Otago Otago	2013-1	Macromolecular Crystallography (MX1) "University of Otago Structural Biology Group"	Preferred Access 1 day 8-9 May
Assoc Prof Emily Parker Prof Geoff Jameson Dr Ali Reza Nazmi Sebastian Reichau Logan Heyes	Canterbury Massey Canterbury Canterbury Canterbury	2013-1	Macromolecular Crystallography (MX1) "Inhibition and allostery of essential bacterial metabolism"	Preferred Access 1 day 9-10 May

Researchers	Institution	Cycle	Beamline	Access
Chris Squire Prof Ted Baker Dr Paul Young Dr Shaun Lott Ghader Bashiri Hanna Kwon	Auckland Auckland Auckland Auckland Auckland Auckland	2013-2	Macromolecular Crystallography (MX1) "Structural and molecular basis of microbial pathogenesis"	Merit Access 1 day 4-5 June
Marco Brenna Prof Shane Cronin	Massey	2013-2	X-ray Fluorescence Microscopy (XFM) "Hyper-enrichment of incompatible trace elements in phonolite eruptives; a sweating magma chamber or residual liquids?"	Preferred Access 3 days 6-9 June
Dr Renwick Dobson Dr Michael Griffin Dr Sarah Kessans Jennifer Crowther Dr Muge Kasanmascheff Rachel North Arvind Ravichandran Katherine Donovan	Canterbury Melb. Univ. Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-2	Micro Crystallography (MX2)	Melb. Univ FI time 3 days 7-8 June 5-6 July 2-3 August
Dr Tilo Soehnel Morgan Allison	Auckland Auckland	2013-2	Powder Diffraction (PD) "Structural studies of (M'M")3Si2Sn7O16 (M=Mn,Fe,Co)"	Preferred Access 1 day 14-15 June
Prof Kurt Krause Prof Catherine Day Dr Sigurd Wilbanks Dr Gregory Cook Emma Scaletti	Otago Otago Otago Otago Otago	2013-2	Macromolecular Crystallography (MX1) "University of Otago Structural Biology Group"	Merit Access 2 days 16-17 June, and 15-16 August
Prof Vic Arcus Dr Emma Summers Dr Judith Burrows Emma Andrews Tifany Oulavallickal Erica Prentice ChelseaVickers	Waikato Waikato Waikato Waikato Waikato Waikato Waikato	2013-2	Macromolecular Crystallography (MX1) "Proteins from Mycobacteria and Bacillus"	Merit Access 1 day 18-19 June
Dr Grant Pearce Dr Renwick Dobson Assoc Prof Bridget Mabbutt Dr Michael Griffin Hayden Mertens Prof Juliet Gerard Dr Celine Valery Prof Peter Steel	Canterbury Canterbury Macquarie U. Melbourne U. Aust. Synch Canterbury Canterbury Canterbury	2013-2	Small/Wide Angle X-ray Scattering (SAXS) "Assembly of Ring shaped proteins into higher order assemblies"	Preferred Access 1 day 18-19 June
Assoc Prof Emily Parker Dr Renwick Dobson Dr Grant Pearce Penelope Cross Dr Sebastian Reichau Dr Ali Reza Nazmi	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2013-2	Small/Wide Angle X-ray Scattering (SAXS) "Allosteric control of aromatic amino acid biosynthesis: Complex formation and conformational changes"	Preferred Access 1 day 26-27 June

Researchers	Institution	Cycle	Beamline	Access
Dr Vince Carbone Dr Ron Ronimus Dr Linley Schofield	AgResearch AgResearch AgResearch	2013-2	Macromolecular Crystallography (MX1) "Structural characterization of the archaeal enzyme glycerol-1- phosphate dehydrogenase (G1P) and Thioredoxin (Trx) from the syphilis causative pathogen, Treponema pallidum"	Merit Access 1 day 26-27 June
Chris Squire Prof Ted Baker Dr Paul Young Dr Shaun Lott Ghader Bashiri Hanna Kwon	Auckland Auckland Auckland Auckland Auckland Auckland	2013-2	Micro Crystallography (MX2) "Structural and molecular basis of microbial pathogenesis"	Merit Access 1 day 30 Jun – 1 Jul

Australian Synchrotron

A synchrotron is a large research facility that generates an extremely intense beam of electromagnetic radiation ('light') that can be used for scientific experiments. The radiation is produced by taking a stream of electrons travelling at close to the speed of light, and deflecting them with magnetic fields. The light covers the electromagnetic spectrum from the infrared to the hard x-ray region.



Electrons are generated in the linear accelerator (linac), and progress into the smaller 'booster' ring, where they are further accelerated up to their final velocity (99.99% of the speed of light, a kinetic energy of 3.0 GeV). At this point they are 'injected' into the larger storage ring, where they circulate for a period of hours to days. The electron beam is steered and focused by magnetic fields. At each point where the beam is deflected, electromagnetic radiation is produced tangential to the beam path. 'Insertion devices', undulators and wigglers, are periodic magnet structures that serve to increase the radiation flux by up to five orders of magnitude. The radiation produced can be used in many different experiments and techniques. The light is channelled from the ring down a number of 'beam lines', each of which is optimised for a particular experimental technique.

The status of the various beam lines at the Australian Synchrotron can be summarised as follows:

- Protein crystallography (PX1) was the first beam line to become operational and began accepting general users in January 2008. This technique uses x-ray diffraction to determine the structure of proteins, used in drug design and understanding biochemical interactions.
- Infrared spectroscopy and microscopy (IR) also came online in early 2008. The beam line features two endstations: an FTIR spectrometer and an infrared microscope.
- Powder diffraction (PD) began taking general users in February 2008 and was fully operational by May 2008. This beam line is a general purpose diffraction beam line with several sample environments for observing changes in materials structure as a function of temperature, pressure, time, etc.

- The soft x-ray absorption spectroscopy (SXR) beamline was available for general users from the September-December 2008 cycle. It operates at low x-ray energies and is most useful for surface studies.
- Final commissioning of the X-ray absorption spectroscopy (XAS) beam line was completed at the end of 2008 and became available to general users from January 2009. This technique is useful for probing elemental valence states and determining the local structure around an atomic species of interest.
- Small-angle x-ray scattering (SAXS), combined with wide-angle x-ray scattering (WAXS) is a useful technique for determining large scale (1-100 nm), short-range order in materials. This beam line came online at the beginning of 2009.
- The commissioning of the second protein crystallography and small-molecule crystallography beamline (PX2) was completed in mid 2009. It complements the existing protein crystallography beam line and is able to measure micron-sized crystals and other weakly-scattering or hard to crystallise systems.
- The microspectroscopy beam line (XFM) construction was also completed in early 2009. This beamline combines the high spatial resolution of a microscope with the information that can be gleaned through x-ray fluorescence spectroscopy.
- The medical imaging and therapy beam line is has only recently become available for limited use. It was redesigned from its original concept. The redesign involved a 150 m long enclosure being built which extends well outside the synchrotron building.



The New Zealand Synchrotron Group was one of ten foundation investors, each of whom has contributed A\$5 million towards the initial suite of beam lines. This investment secured preferred (as-of-right) access for each foundation investor, spread over all the beam lines. For NZSG this typically amounted to approximately 3 days per beam line per four-month cycle. Proposals for preferred access are submitted at the same time as general access and undergo an internal selection process. The criteria the NZSG access committee has adopted seeks to favour new users to obtain beam time. The preferred access arrangements for foundation investors ceases in August 2013.

With the completion of the initial suite of nine beamlines, thoughts have now turned to the possibility of adding new beamlines to expand the facilities capabilities. The Australian Synchrotron has consulted with the research communities in Australia and New Zealand and a Science Case to add a further 10 beamlines and make other upgrades to the facility was published in July 2010. Consideration of this Case was set aside while arrangements were made to secure operating funding from the Australian Commonwealth and the Victorian State Governments and the other Foundation Investors. New Zealand has been offered the opportunity to contribute to the development and secure ongoing access for New Zealand researchers to the enhanced facility and this is expected to be reactivated in the next 12 months.

In 2012 discussions were held between the Victorian State government and the Commonwealth government regarding the future funding of the operating costs for the Synchrotron. Foundation investors, including NZSG were involved in those discussions. The outcome was that the Commonwealth government would take an increased role in providing operating funding for the facility and a structure was established under which the facility was leased to a new subsidiary of the Australian Nuclear Science and Technology Organisation (ANSTO), the Synchrotron Light Source Australia Pty Ltd (SLSA) which became the new operator with effect from 1 January 2013. An operating funding package of A\$100 million over four years from 1 July 2012 to 30 June 2016 was negotiated with the funding being provided by both the Australian research sector and the Victorian State and Commonwealth governments. New Zealand was invited to participate in this arrangement and NZSG has agreed to provide 5% of the operating funds in return for 5% of the future access. Agreements establishing the funding and access arrangements for New Zealand were signed in July 2013.

CORPORATE GOVERNANCE

Board Composition

The company operates with a board comprising of 5 directors, including an independent chairman. Interim directors were appointed initially. These were replaced by a permanent board following elections which were held in April 2007.

The Directors during the period up to 30 June 2013 were:

Dr Garth Carnaby, Chair Dr Desmond Darby, GNS Science Professor Geoffrey Jameson, Massey University Professor James Metson, The University of Auckland Professor Ian Shaw, University of Canterbury

Indemnities and Insurance

The Board has taken Directors and Officers Liability Insurance with Lumley General Insurance Limited. Coverage of up to \$5 million has been obtained.

Attendance at Board Meetings

The following table shows the attendance at meetings of the Board for each director and the fees paid.

Director	No. meetings held during the year	No. meetings attended	Fees paid
Dr Garth Carnaby	6	6	\$6,000
Dr Desmond Darby	6	5	-
Professor Geoffrey Jameson	6	6	-
Professor James Metson	6	6	-
Professor Ian Shaw	6	4	-

Donations

The company did not make any donations during the period from establishment up to 30 June 2013.

Interests Register

During the course of undertaking its normal business activities in supporting the development of synchrotron science, the company provides assistance towards the travel costs for research staff from its shareholders. The practice at meetings of the board is for directors from organisations who are receiving financial support to declare an interest and to refrain from voting on that particular matter. During the period up to 30 June 2013 support was provided to staff from The University of Auckland, Massey University, the University of Canterbury and GNS Sciences.

The following significant entries relating to the directors were recorded in the Interests Register during the period.

Director	Organisation/Entity	Nature of Interest
Dr GA Carnaby		~ ~ ~
Shares Held Beneficiary of Trusts	GA Carnaby & Associates Ltd Carnaby Trust	Controlling majority Trustee and discretionary
Denenerary of Trusts		beneficiary
Offices Held	National Provident Fund	Annuity/Defined benefit Chair
Offices Held	Canterbury Development Corporation	Chair
	Canterbury Economic	Chair
	Development Trustee Ltd Food Innovation South Island	Chair
	Lincoln University	Entrepreneur in Residence
Other Interests	TEC/Ministry of Education	Adviser re PBRF
Dr D Dorthr		
Dr D Darby Shares Held	Vector Ltd	Minority shareholder
	Sound Direction Ltd	Majority shareholder
Offices Held	Sound Direction Ltd GNS Science	Director Senior manager
	NZ Association of Scientists	Council member
Prof GB Jameson Shares Held	Tower Ltd	Minority sharaholdor
Beneficiary of Trusts	Estate of MEB Jameson	Minority shareholder Discretionary beneficiary
Offices Held	Massey University	Employee
Des 6 ID Materia		
Prof JB Metson Shares Held	Vector Energy	Minority shareholder
	Pacific Lithium	Minority shareholder
Offices Held Other Interests	University of Auckland RIAG	Employee Chair
Other Interests	NIAU	Undif
Prof IC Shaw		
Offices Held	University of Canterbury	Employee
Other Interests	Sandoz GmbH, Austria	Consultant

New Zealand Synchrotron Group Limited Financial Statements

for the year ended 30 June 2013

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New Zealand Synchrotron Group Limited Board Report for the year ended 30 June 2013

The Board has pleasure in presenting the annual report of the New Zealand Synchrotron Group Limited ("NZSG") incorporating the financial statements and the auditors' report, for the year ended 30 June 2013.

NZSG administers the investment in Australian Synchrotron Holding Company (ASHC).

The Company has taken advantage of the reporting concessions available to it under sections 211(3) of the Companies Act 1993.

The Board of NZSG has authorised these financial statements presented on pages 6 to 17 for issue on 18 October 2013.

For and on behalf of the Board

Garth Carnaby

Garth Carnaby Chairperson

18 October 2013

Date

Desmond 'Darby

Director

18 October 2013

Date



Independent Auditors' Report

to the readers of the New Zealand Synchrotron Group Limited's Financial Statements for the year ended 30 June 2013

The Auditor-General is the auditor of the New Zealand Synchrotron Group Limited (the 'Company'). The Auditor-General has appointed me, Chris Barber, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the Company on her behalf.

We have audited the financial statements of the Company on pages 6 to 17, that comprise the balance sheet as at 30 June 2013, the statement of comprehensive income, statement of changes in equity, and statement of cash flows for the year ended on that date and the notes to the financial statements that include accounting policies and other explanatory information.

Opinion

In our opinion the financial statements of the Company on pages 6 to 17:

- comply with generally accepted accounting practice in New Zealand; and
- give a true and fair view of the Company's:
 - financial position as at 30 June 2013; and
 - financial performance and cash flows for the year ended on that date.

Other legal requirements

In accordance with the Financial Reporting Act 1993 we report that, in our opinion, proper accounting records have been kept by the Company as far as appears from an examination of those records.

Our audit was completed on 18 October 2013. This is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities, and we explain our independence.

Basis of opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the International Standards on Auditing (New Zealand). Those standards require that we comply with ethical requirements and plan and carry out our audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Material misstatements are differences or omissions of amounts and disclosures that, in our judgement, are likely to influence readers' overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

An audit involves carrying out procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgement, including our assessment of risks of material misstatement of the financial statements whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the preparation of the Company's financial statements that give a true and fair view of the matters to which they relate. We consider internal control in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

PricewaterhouseCoopers, 113 – 119 The Terrace, PO Box 243, Wellington 6140, New Zealand T: +64 (4) 462 7000, F: +64 (4) 462 7001, www.pwc.com/nz



Independent Auditors' report

New Zealand Synchrotron Group Limited's Financial Statements for the year ended 30 June 2013

An audit also involves evaluating:

- the appropriateness of accounting policies used and whether they have been consistently applied;
- the reasonableness of the significant accounting estimates and judgments made by the Board of Directors;
- the adequacy of all disclosures in the financial statements; and
- the overall presentation of the financial statements.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements. Also we did not evaluate the security and controls over the electronic publication of the financial statements.

In accordance with the Financial Reporting Act 1993, we report that we have obtained all the information and explanations we have required.

We have obtained all the information and explanations we have required and we believe we have obtained sufficient and appropriate audit evidence to provide a basis for our audit opinion.

Responsibilities of the Board of Directors

The Board of Directors is responsible for preparing financial statements that:

- comply with generally accepted accounting practice in New Zealand; and
- give a true and fair view of the Company's financial position, financial performance and cash flows.

The Board of Directors is also responsible for such internal control as it determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

The Board of Directors' responsibilities arise from the Financial Reporting Act 1993.

Responsibilities of the Auditor

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you based on our audit. Our responsibility arises from section 15 of the Public Audit Act 2001.

Independence

When carrying out the audit we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the External Reporting Board.

Other than the audit, we have no relationship with or interests in the Company.

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Chris Barber On behalf of the Auditor-General Wellington, New Zealand

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PricewaterhouseCoopers

New Zealand Synchrotron Group Limited Statement of comprehensive income for the year ended 30 June 2013

		2013 Unaudited	2013	2012
		budget	Actual	Actual
		\$	\$	\$
Income	Note			
Income for Australian Operations	3	1,077,279	1,043,064	1,053,706
Income for NZ Operations	4	185,000	176,765	205,779
Total Income		1,262,279	1,219,829	1,259,485
Expenditure				
Amortisation	10	1,142,755	1,142,755	1,142,750
Australian Synchrotron Group costs	5	1,077,279	1,043,064	1,053,706
Other operating costs	6	248,700	250,810	289,673
Operating expenditure		2,468,734	2,436,629	2,486,129
Net loss before taxes		(1,206,455)	(1,216,800)	(1,226,644)
Income tax expense	7	-	-	-
Net loss after taxes		(1,206,455)	(1,216,800)	(1,226,644)
Other comprehensive income		-	-	-
Total comprehensive loss		(1,206,455)	(1,216,800)	(1,226,644)

The above statement of comprehensive income should be read in conjunction with the accompanying notes on pages 10 -17 $\,$

New Zealand Synchrotron Group Limited Statement of changes in equity for the year ended 30 June 2013

	Notes	Share capital \$	Retained earnings \$	Total equity \$
Balance as at 30 June 2011		2,824,036	(187,596)	2,636,440
Net loss Other comprehensive income Total comprehensive loss		- - -	(1,226,644) (1,226,644)	(1,226,644) (1,226,644)
Balance as at 30 June 2012		2,824,036	(1,414,240)	1,409,796
Net loss Other comprehensive income Total comprehensive loss		- - -	(1,216,800) 	(1,216,800) (1,216,800)
Balance as at 30 June 2013		2,824,036	(2,631,040)	192,996

The above statement of changes in equity should be read in conjunction with the accompanying notes on pages 10 - 17 $\,$

New Zealand Synchrotron Group Limited **Balance sheet** as at 30 June 2013

	Note	2013	2012
		\$	\$
Current assets			
Cash and cash equivalents	8	204,485	273,521
Trade and other receivables	9	80,095	96,580
Investment in ASHC	10		1,142,754
Total current assets		284,580	1,512,855
TOTAL ASSETS		284,580	1,512,855
Current liabilities			
Trade and other payables	11	91,584	103,059
Total current liabilities		91,584	103,059
TOTAL LIABILITIES		91,584	103,059
Net assets		192,996	1,409,796
Equity			
Share capital	16	2,824,036	2,824,036
Retained earnings		(2,631,040)	(1,414,240)
TOTAL EQUITY		192,996	1,409,796

For and on behalf of the Board

<u>J.</u>9. Canneby Garth Carnaby

Chair Person

Date: 18 October 2013

Desmond Darby

Director

Date: 18 October 2013

The above balance sheet should be read in conjunction with the accompanying notes on pages 10 - 17

New Zealand Synchrotron Group Limited Statement of cashflows for the year ended 30 June 2013

	Notes	2013 \$	2012 \$
Cash flows from operating activities Cash was provided from: Interest	4	5,144	10,904
Shareholders Grants for Australian Synchrotron and New Zealand Synchrotron Group Costs and	7	5,177	10,504
Contribution from Australian Synchrotron Group for Travel Cost		1,227,992	1,205,558
Goods and Service Tax (Net)		-	1,318
Total cash provided		1,233,136	1,217,780
Cash was applied to:			
Australian Synchrotron Group Costs		(1,051,362)	(1,053,706)
Other expenses		(250,812)	(212,233)
Total cash applied		(1,302,174)	(1,265,939)
Net cash outflow from operating activities	18	(69,038)	(48,159)
		<i>(</i>)	(
Net decrease in cash held	0	(69,038)	(48,159)
Cash balance at the beginning of the year Cash balance at the end of the year	8 8	273,522 204,484	321,681 273,522
Cash balance at the end of the year	0	204,404	213,322

The above statement of cashflows should be read in conjunction with the accompanying notes on pages 10 - 17

Note 1. General information

New Zealand Synchrotron Group ("the Company") was formed on 13 September 2006. The purpose of the Company is to invest in the Australian Synchrotron by subscribing to shares in the Australian Synchrotron Holding Company Pty Limited ("ASHC") and being a member of the Australian Synchrotron Company Limited. In addition, the Company also promotes synchrotron science, assists the development of capability of New Zealand researchers in synchrotron science and manages the access of New Zealand researchers to the Australian Synchrotron. It has eleven shareholders who are all either New Zealand universities or Crown Research Institutes. The company is managed by a five person board elected by the shareholders, including an independent Chair. The Chair receives remuneration; the other directors do not. The Royal Society of New Zealand has been contracted to provide secretariat services to the Board.

The Company's revenue consists of grants from government agencies to build awareness and capability in synchrotron science and investment income. Its registered office is 6 Turnbull Street, Thorndon, Wellington.

The financial statements have been approved for issue by the Board on 18 October 2013

Note 2. Summary of significant accounting policies

These financial statements have been prepared in accordance with Generally Accepted Accounting Practice in New Zealand (NZ GAAP). They comply with the New Zealand Equivalents to International Financial Reporting Standards (NZ IFRS) and other applicable Financial Reporting Standards, as appropriate for public benefit entities that qualify and apply differential reporting concessions.

(a) Basis of preparation

The principal accounting policies adopted in the preparation of the financial statements are set out below. These policies have been consistently applied to all the periods presented, unless otherwise stated.

Statutory base

New Zealand Synchrotron Group Limited ("NZSG" or the "Company") is a company registered under the Companies Act 1993.

The financial statements have been prepared in accordance with the Financial Reporting Act 1993.

Differential reporting

NZSG is a qualifying entity within the Framework of Differential Reporting. NZSG qualifies on the basis that it is neither an issuer nor large (has less than 50 employees and total income below \$20 million). NZSG has taken advantage of all differential reporting concessions available to them except for NZIAS 18 Revenue paragraph NZ6.1 and NZ IAS 7 Statement of Cash Flows with which it has complied with fully.

Historical cost convention

These financial statements have been prepared under the historical cost convention, as modified by the revaluation of certain assets as identified in specific accounting policies below.

(b) Foreign currency translation

(i)

financial statements are presented in New Zealand dellars, which is

The financial statements are presented in New Zealand dollars, which is the Company's functional and presentation currency.

(ii) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of comprehensive income.

(c) Revenue recognition

Revenue comprises the fair value for the sale of goods and services, excluding Goods and Services Tax, rebates and discounts . Revenue is recognised as follows:

(i) Interest income

Interest income is recognised on a time proportion basis using the effective interest method. When a receivable is impaired, NZSG reduces the carrying amount to its recoverable amount, being the estimated future cash flow discounted at original effective interest rate of the instrument, and continues unwinding the discount as interest income. Interest income on impaired loans is recognised using the rate of interest used to discount the future cash flows for the purpose of measuring the impairment loss.

(ii) Government grants, sponsorships and donations

Government grants and non-government grants are recognised as revenue when they become receivables unless there is an obligation to return the funds if conditions of the grant are not met. If there is such an obligation, the grants are initially recorded as grants received in advance and recognised as revenue when conditions of the grant are satisfied.

(d) Income Tax

From 1 July 2009 the NZSG has been granted a Tax Exemption under Section CW49 of the Income Tax Act 2007. As a consequence NZSG will have no ongoing liability for Income Tax.

(e) Goods and Services Tax (GST)

The statement of comprehensive income has been prepared so that all components are stated exclusive of GST. All items in the balance sheet are stated net of GST, with the exception of receivables and payables, which include GST invoiced.

(f) Cash and cash equivalents

Cash and cash equivalents includes cash on hand, deposits held at call with financial institutions and other short-term, highly liquid investments with original maturities of three months or less that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

(g) Trade receivables

Trade receivables are recognised initially at fair value and subsequently measured at amortised cost, less provision for doubtful debts.

The recoverability of trade receivables is reviewed on an ongoing basis. Debts which are known to be uncollectible are written off. A provision for doubtful receivables is established when there is objective evidence that NZSG will not be able to collect all amounts due according to the original terms of receivables. The amount of the provision is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the effective interest rate. The amount of the provision is recognised in the statement of comprehensive income.

(h) Investments and other financial assets

NZSG classifies its investments in the following categories: loans and receivables and available for sale financial assets. The classification depends on the purpose for which the investments were acquired. Management determines the classification of its investments at the initial recognition and re-evaluates this designation at every reporting date.

(i) Loans and receivables

Loans and receivables are non derivative financial assets with fixed or determinable payments that are not quoted in an active market. They arise when NZSG provides money, goods or services directly to a debtor with no intention of selling the receivable. They are included in current assets, except for those with maturities greater than 12 months after the balance sheet date which are classified as non-current assets. Loans and receivables are classified as 'trade and other receivables' in the balance sheet.

(ii) Available for sale financial assets

The investment in the Australian Synchrotron Holding Pty ("ASHC") is classified as an asset that is available for sale. As there are no active markets for this investment, it is stated at cost less impairment. Impairment is assessed annually at the balance sheet date and is primarily determined as the equivalent of the original cost of the investment amortised on a straight line basis over the remaining useful life of the underlying asset (investment), to be determined once it is commissioned. The current beam line access agreement provides benefits from the investment until June 2013. The investment is therefore being amortised over the 5 year period commencing 1 July 2008.

Loans and receivables investments are subsequently carried at amortised cost using the effective interest method.

(i) Trade and other payables

These amounts represent liabilities for goods and services provided to NZSG prior to the end of financial year which are unpaid. The amounts are unsecured and are usually paid within 30 days of recognition. Trade and other payables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method.

(j) Sponsorship and donations expense

Through the ordinary course of its activities the Company provides sponsorships and makes donations to advance its stated objectives. The Company recognises a liability for this expenditure when the recipient meets any eligibility criteria attached to a sponsorship or donation agreement.

(k) Statement of Cash Flows

The following are the definitions of the terms used in the Statement of Cash Flows:

- i) Cash is considered to be cash on hand, cash in transit, bank accounts and deposits with a maturity of no more than 3 months from the date of acquisition;
- ii) Investing activities are those relating to acquisition, holding and disposal of investment in ASHC and investments not falling within the definition of cash;
- iii) Financing activities are those activities which result in changes in the size and composition of the capital structure of the Company. This includes equity, debt not falling within the definition of cash.

(I) Changes to accounting policies

There have been no changes in accounting policies.

Note 3. The Compa Synchrotro	Income for Australian Operations my receives support from the shareholders for Australian n costs.	2013 \$ 1,043,064 1,043,064	2012 \$ 1,053,706 1,053,706
Note 4.	Other income	2013 \$	2012 \$
	Grants from shareholders for operating costs of NZSG	25,000	25,000
	Contribution from the ASCH of incurred travel costs	146,621	169,875
	Interest	5,144	10,904
		176,765	205,779

Note 5. Australian Synchrotron Group costs

As detailed in note 13 the Company makes an annual contribution to the ongoing operating costs of the Australian Synchrotron.

Note 6.	Included in other operating costs		
(a) During the	Remuneration of auditor year the following fees were paid or payable		
	provided by the OAG appointed auditor – r with assistance from	2013	2012
Pricewater	nouseCoopers.	\$	\$
Statutory a	udit services	7,350	8,970
were made	Foreign exchange (gains) / losses year the following exchange losses / (gains) on transactions between New Zealand and		
Australia.		2013	2012
	Foreign exchange (gains) / losses	\$ 9,870	\$ 11,993

(c) Support for Synchrotron Science

During the year the following fees were paid or payable for services provided.

	2013 \$	2012 \$
Travel costs reimbursed to related parties Travel costs reimbursed to researchers and	145,450	161,566
other entities	-	11,039
Meetings, workshops, summer school costs	326	1,307
	145,776	173,912

(d) Secretariat and other operating costs

During the year the following fees were paid or payable for services provided.

	2013	2012
	Ş	Ş
Secretariat services from the Royal Society		
and Board costs	56,432	69,817
Preparation of Investment Case	23,845	21,094
Insurance	3,792	3,325
Other	3,747	562
	87,816	94,798
Total other operating costs	250,812	289,673

Note 7. Income Tax

From the 1 July 2009 the NZSG has been granted a Tax Exemption under Section CW49 of the Income Tax Act 2007. As a consequence NZSG does not have an ongoing liability for Income Tax.

Note 8. Cash and cash equivalents

	2013	2012
	\$	\$
Cash	161	4,046
Foreign currency - AUD	204,324	269,475
	204,485	273,521

All the bank balances are held with the Bank of New Zealand.

Note 9. Trade and other receivables

	2013	2012
	\$	\$
Trade receivables	6,555	55,092
Sundry receivables	72,082	36,852
Prepayments	1,458	2,464
Goods and Services Tax receivable	0	2,172
Total trade and other receivables	80,095	96,580

Note 10. Investment in the ASHC

	2013	2012
	\$	\$
Investments in ASHC	5,713,750	5,713,750
Accumulated amortisation	(4,570,995)	(3,428,246)
Current year amortisation	(1,142,755)	(1,142,750)
Net investment in ASHC	-	1,142,754

The investment in the ASHC has been amortised on a straight line basis over a period of five years as this was management's best estimate of the access period to use the synchrotron. Subsequent to balance date the company has entered into a new agreement for access to use the synchrotron. Refer to note 15 for further details.

Note 11. Trade and other payables

	2013	2012
	\$	\$
Creditors	68,322	52,955
Accruals	23,262	50,104
Total trade and other payables	91,584	103,059
The amount owed to related parties as at 30 June 2013 \$36,852	. (2012: \$36,852).	

Note 12. Commitments

An agreement has been signed on the 31st July 2013, between NZSG and Synchrotron Light Source Australia Pty Ltd whereby NZSG undertakes to provide AUD4.17m over three years in return for 5% of the access. As part of the Participant's agreement entered into with 8 of the shareholders, these funds will be received directly from the Participants or MBIE on their behalf when required to fulfil these obligations.

Note 13. Contingent liabilities

There were no contingent liabilities at 30 June 2013. (2012: nil)

Note 14 Related parties

Related parties comprise of the shareholders identified in Note 16. There have been a number of related party transactions during the year ended 30 June 2013.

These transactions include grants from shareholders as per Note 3 and for operating and travel costs reimbursed as per note 6.

The amount outstanding as at 30 June 2013 is travel costs of \$72,082 (2012: \$35,853).

Note 15. Events occurring after balance date

Post balance date the shareholders have approved a special resolution to amend the Participants Agreement, approve the company entering into the Crown Funding Agreement, the Funders Agreement and the Funding and Access Agreement and acknowledging that access rights previously enjoyed by shareholders would cease on 31 August 2013.

The company has entered into a 3 year agreement with the Ministry of Business, Innovation and Employment for Crown Funding totalling AUD2,211,750.

The company has entered into a forward contract for AUD650,000 with Western Union at an exchange rate of 0.8750. This contract covers future payments to Australian Synchrotron over a period of three years.

New Zealand Synchrotron Group Limited Notes to the Financial Statements for the year ended 30 June 2013

Shareholding value at cost 2013 2012 \$ <	Note 16.	Share capital		
University of Auckland 509,217 509,217 University of Waikato 190,357 190,357 Massey University 428,317 428,317 Victoria University of Wellington 237,966 237,966 University of Canterbury 285,546 285,546 Lincoln University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held 436,319 University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 244,668 244		Shareholding value at cost	2013	2012
University of Waikato 190,357 190,357 Massey University 428,317 428,317 Victoria University of Wellington 237,966 237,966 University of Canterbury 285,546 285,546 Lincoln University 285,546 285,546 Agresearch Ltd 285,546 285,546 Agresearch Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 190,357 190,357 Industrial Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held 436,319 University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 204,668 244,668 University of Canterbury 244,668 244,668 University of Canterbury 244,668 244,668 University of Canterbury 244,668 244			\$	\$
Massey University 428,317 428,317 Victoria University of Wellington 237,966 237,966 University of Canterbury 285,546 285,546 Lincoln University 285,57 28,557 Otago University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 192,270 192,270 Z,824,036 Z,824,036 Z,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held 163,104 University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 244,668 244,668 Lincoln University 244,668 244,668 Lincoln University 244,668 244,668		University of Auckland	509,217	509,217
Victoria University of Wellington 237,966 237,966 University of Canterbury 285,546 285,546 Lincoln University 28,557 28,557 Otago University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 2,824,036 Z.824,036 Z.824,036 285,346 University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 24,4668 244,668 AgResearch Ltd 163,104 163,104 Incoln University 24,4668 244,668 A		University of Waikato	190,357	190,357
University of Canterbury 285,546 285,546 Lincoln University 28,557 28,557 Otago University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 192,270 192,270 2,8224,036 2,824,036 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held # of shares held University of Auckland 436,319 436,319 University of Canterbury 244,668 244,668 Lincoln University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 244,668 244,668 AgResearch Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Massey University	428,317	428,317
Lincoln University 28,557 28,557 Otago University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 192,270 192,270 Industrial Research Ltd 192,270 2,824,036 Z824,036 Z,824,036 Z,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held # of shares held University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Victoria University of Wellington	237,966	237,966
Otago University 285,546 285,546 AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held # of shares held University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 AgResearch Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		University of Canterbury	285,546	285,546
AgResearch Ltd 285,546 285,546 Sciences Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 192,270 2,824,036 2,824,036 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held # of shares held University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 244,668 244,668 AgResearch Ltd 244,668 244,668 AgResearch Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Lincoln University	28,557	28,557
Sciences Ltd 190,357 190,357 Food Research Ltd 190,357 190,357 Industrial Research Ltd 192,270 192,270 2,824,036 2,824,036 2,824,036 The shares held at 30 June are: 2013 2012 # of shares held # of shares held # of shares held University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 244,668 244,668 AgResearch Ltd 244,668 244,668 AgResearch Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Otago University	285,546	285,546
Food Research Ltd190,357190,357Industrial Research Ltd192,270192,2702,824,0362,824,0362,824,036The shares held at 30 June are:20132012# of shares held# of shares held# of shares heldUniversity of Auckland436,319436,319University of Waikato163,104163,104Massey University367,001367,001Victoria University of Wellington203,897203,897University of Canterbury244,668244,668Lincoln University244,668244,668AgResearch Ltd244,668244,668Sciences Ltd163,104163,104Food Research Ltd163,104163,104Industrial Research Ltd163,104163,104		AgResearch Ltd	285,546	285,546
Industrial Research Ltd192,270 2,824,036192,270 2,824,036The shares held at 30 June are:2013 # of shares held # of shares held2012 # of shares held # of shares heldUniversity of Auckland436,319436,319 436,319University of Waikato163,104163,104Massey University367,001367,001Victoria University of Wellington203,897203,897University of Canterbury244,668244,668Lincoln University244,668244,668AgResearch Ltd244,668244,668Sciences Ltd163,104163,104Food Research Ltd163,104163,104Industrial Research Ltd163,104163,104		Sciences Ltd	190,357	190,357
Z,824,036Z,824,036The shares held at 30 June are:20132012# of shares held# of shares heldUniversity of Auckland436,319436,319University of Waikato163,104163,104Massey University367,001367,001Victoria University of Wellington203,897203,897University of Canterbury244,668244,668Lincoln University244,668244,668AgResearch Ltd244,668244,668Sciences Ltd163,104163,104Food Research Ltd163,104163,104Industrial Research Ltd163,104163,104		Food Research Ltd	190,357	190,357
The shares held at 30 June are:20132012# of shares held# of shares heldUniversity of Auckland436,319University of Waikato163,104Massey University367,001Victoria University of Wellington203,897University of Canterbury244,668Lincoln University244,668Lincoln University244,668AgResearch Ltd244,668Sciences Ltd163,104Food Research Ltd163,104Industrial Research Ltd163,104Industrial Research Ltd163,104		Industrial Research Ltd	192,270	192,270
# of shares held# of shares heldUniversity of Auckland436,319University of Waikato163,104Massey University367,001Victoria University of Wellington203,897University of Canterbury244,668Lincoln University244,668Lincoln University244,668AgResearch Ltd244,668Sciences Ltd163,104Food Research Ltd163,104Industrial Research Ltd163,104Industrial Research Ltd163,104			2,824,036	2,824,036
# of shares held# of shares heldUniversity of Auckland436,319University of Waikato163,104Massey University367,001Victoria University of Wellington203,897University of Canterbury244,668Lincoln University244,668Lincoln University244,668AgResearch Ltd244,668Sciences Ltd163,104Food Research Ltd163,104Industrial Research Ltd163,104Industrial Research Ltd163,104				
University of Auckland 436,319 436,319 University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104	The sha	ares held at 30 June are:	2013	2012
University of Waikato 163,104 163,104 Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104			# of shares held	# of shares held
Massey University 367,001 367,001 Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		University of Auckland	436,319	436,319
Victoria University of Wellington 203,897 203,897 University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		University of Waikato	163,104	163,104
University of Canterbury 244,668 244,668 Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Massey University	367,001	367,001
Lincoln University 24,467 24,467 Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Victoria University of Wellington	203,897	203,897
Otago University 244,668 244,668 AgResearch Ltd 244,668 244,668 Sciences Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		University of Canterbury	244,668	244,668
AgResearch Ltd244,668244,668Sciences Ltd163,104163,104Food Research Ltd163,104163,104Industrial Research Ltd163,104163,104		Lincoln University	24,467	24,467
Sciences Ltd 163,104 163,104 Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		Otago University	244,668	244,668
Food Research Ltd 163,104 163,104 Industrial Research Ltd 163,104 163,104		AgResearch Ltd	244,668	244,668
Industrial Research Ltd 163,104 163,104		Sciences Ltd	163,104	163,104
		Food Research Ltd	163,104	163,104
2,418,104 2,418,104		Industrial Research Ltd	163,104	163,104
			2,418,104	2,418,104

The amount recognised in the balance sheet as paid in capital is the New Zealand dollar equivalent at the date of issuance.

Note 17. Financial instruments

Total

Classificatio	on of financial assets by category	Available for sale	Receivables, Cash & Loans
	2013	\$	\$
	Cash and cash equivalents	-	204,485
	Trade & other receivables	-	80,095
	Total	0	284,580
	2012	\$	\$
	Investment in ASHC	1,142,754	-
	Cash and cash equivalents		273,521
	Trade & other receivables	-	96,580
	Total	1,142,754	370,101
Classification of financial liabilities by category			
Measure	d at amortised cost		
		2013	2012
		\$	\$
	Trade & other payables	91,584	103,059

Note 18. Reconciliation of profit with cash flows from operating activities

	2013 \$	2012 \$
Loss after tax Add/(Less) non-cash items	(1,216,800)	(1,226,644)
Amortisation of Australian Synchrotron	1,142,755	1,142,750
Trade and other receivables - excluding investing		
activities Trade and other payables - excluding investing	13,307	(42,598)
activities	(8,298)	78,333
Net Cash outflow from operating activities	(69,036)	(48,159)

91,584

103,059