



TRIUMF

CANADA'S NATIONAL LABORATORY FOR PARTICLE AND NUCLEAR PHYSICS

Owned and operated as a joint venture by a consortium of Canadian universities via a contribution through the National Research Council Canada

Science Division Goals for FY09-10

Gordon Ball
TRIUMF

*IPP Annual Meeting
Moncton June 7, 2009*

LABORATOIRE NATIONAL CANADIEN POUR LA RECHERCHE EN PHYSIQUE NUCLÉAIRE ET EN PHYSIQUE DES PARTICULES

Propriété d'un consortium d'universités canadiennes, géré en co-entreprise à partir d'une contribution administrée par le Conseil national de recherches Canada



SCIENCE DIVISION G. Ball

DEPUTY
B. Jennings

ADMIN ASSISTANT
N. Martin

Detector Facility
A. Miller

Computing
S. McDonald

ISAC Program
J. Dilling

Particle Physics
A. Konaka

Deputy
F. Retiere

Deputy
K. Raywood

Deputy
J. Behr

Deputy
I. Trigger

Engineering/Construction
R. Henderson

ATLAS TIER 1
R. Tafirout

General Science
Computing
P. Amaudruz

- G. Hackman
- M. Djongolov # (RA) WP
- A. Garnsworthy # (RA) WP
- S. Williams # (RA) WP
- R. Kshetri# (RA) WP
- S. Triambak# (RA) WP
- J. Orce #(RA) WP
- R. Churchman
- L. Buchmann
- G. Ruprecht # (RA) WP
- B. Davids
- S. Sjue # (RA) WP
- P. Delheij
- P. Walden

- J. Dilling
 - M. Good
 - A. Lapierre # (RA)
 - R. Ringle # (RA) WP
- J. Behr
 - A. Gorelov # (RA)
- D. Ottewell
 - P. Machule #
- M. Pearson
- C. Ruiz WP
- U. Hager # (RA) WP

- C. Davis
 - M. Fujiwara
 - J. Storey # (RA)
 - R. Helmer
 - A. Konaka
 - K. Mizouchi # (RA) WP
 - K. Hamano # (RA) WP
 - M. Wilking # (RA) WP
 - R. Poutissou
 - K. Wong #
 - G. Marshall
 - A. Groszheim # (RA) WP
 - R. MacDonald # (RA)

- A. Canepa
- T. Numao
- A. Olin
- O. Stelzer-Chilton
- I. Trigger
 - D. Fortin # (RA)
 - I. Nugent # (RA)
- S. Yen

Development
F. Retiere

Computing &
Network Services
K. Raywood

Admin Computing
G. Jones

Electronics
L. Kurchaninov

University Based

Theory
A. Schwenk

MMS
S. Kreitzman

- W. Faszer
- R. Openshaw
- M. Goyette
- S. Chan
- J. Zielinski
- G. Sheffer
- S. Sooriyakumaran

- D. Deatrich
- N. Bienvenu#
- A. De Silva#
- S. Liu#
- C. Payne
- J. Steele# WP
- A. Wong#

- S. Daviel
- P. Gumplinger
- K. Olchanski
- C. Pearson

- H. Rafighi
- A. Daviel
- L. Ho
- K. Ng
- R. Watt

- C. Lim
- T. Nguyen
- P. Vincent

- J. Brewer
- O. Ofer #(RA) WP
- R. Ofer #(RA) WP
- R. Kanungu
- H. Al Falou # (RA) WP

- D. Bryman
- A. Aguilar-Arevalo # (RA) WP
- L. Doria # (RA) WP
- A. Muennich # (RA) WP
- A. Sher # (RA) WP
- D. Gingrich ##(UofA)
- B. Caron
- K. Kovacs
- J. Schaapman
- M. Dixit (Carleton)
- G. Oakham## (Carleton)
- D. Sinclair## (Carleton)

- A. Chen ## (McMaster)
- G. Azuelos (UofM)
- R. Tacik (UofR)
- M. Vetterli ## (SFU)
- P. Percival ## (SFU)
- A. Zhang
- P. Savard ## (UofT)
- D. Karlen ## (Uvic)
- L. Charron
- P. Garrett ##(Guelph)
- W. Van Oers
- L. Lee # (RA)
- D. Ramsay # (RA)

Deputy
R. Woloshyn

- J. Ng
- R. Woloshyn
- I. Allison # (RA) WP
- S. Bacca # (RA) WP
- S. Barone # (RA) WP
- J. Braun # (RA) WP
- J. Holt # (RA) WP
- K. McDonald # (RA) WP
- K. Hebelier # (RA) WP

Deputy
G. Morris

- R. Abasalti #
- D. Arseneau #
- T. Goko # WP
- B. Hitti #
- M. McLay #
- O. Sukharukov #WP
- D. Vyas #

Science Division Goals FY09-10

- Particle Physics
- ISAC Science
- Theory
- Detector Development
- Material and Molecular Science
- Computing Services

Accelerator Division Goals FY09-10

Project management at TRIUMF

Mission statement: Particle Physics

Lead world-class Particle Physics experiments in strong collaboration with Canadian universities.

Provide, maintain, and exploit the specialized, centralized facilities at TRIUMF required for Canadian scientists to perform state-of-the-art particle physics experiments here, elsewhere in Canada, and abroad. This includes development of beams, detectors, electronics, data acquisition, computing facilities and data analysis.

Train students and young scientists to become leaders in Canada's future scientific endeavours. Train HQP in electronics, computing and detector technology.

Particle Physics Priorities for FY09-10

Operation and analysis of the on-going projects

- ATLAS
 - Tier 1 to continue 24/7 operation during data taking era, acquire and deploy 2009 resources by September, and upgrade infrastructure for cooling units and electrical circuits.
 - Analysis centre to begin hosting students and visitors, becoming centre of local ATLAS activity, integrate new theorist.
- T2K
 - Complete the detector construction, installation and commissioning.
 - Establish analysis centre at TRIUMF for T2K to take advantage of central geographical position and strong local leadership.

- **Pienu**
 - **Complete the engineering run and start taking physics data**
 - **TWIST**
 - **Complete their analysis and achieve their goal of an order of magnitude increase in the precision of the determination of the space-time structure of the weak interaction.**
 - **ALPHA**
 - **Establish the conditions necessary to form and trap anti-hydrogen and develop techniques to study its spectroscopy in the trap environment.**
 - **QWEAK**
 - **Get on the floor in Hall C.**
 - **SNOlab**
 - **Further develop TRIUMF participation in the SNOlab projects, DEAP, SNO+, HALO (installed underground in 2009), and EXO-gas.**
-

Detector Group Priorities for 2009

Complete construction of detectors for T2K, PIENU, ALPHA

Experiments ongoing or ramping up

- ISAC: EMMA, SHARC (front end electronics), TACTIC
- SNOLAB: DEAP (readout electronics), SNO+
- External: QWEAK (front end electronics for diamond detector)
- Medical imaging: Liquid Xenon PET

Research and development

- Multi-Pixel Photon Counter for replacing PMTs
- Cadmium Zinc Telluride in collaboration with Redlen
- Diamond detector for ATLAS upgrade

Longer term goals 2010-2015

Physics results expected from ATLAS, T2K and others provide a guide for future directions.

- TRIUMF ATLAS analysis centre to be used to ensure Canadian leadership in ATLAS analysis and discoveries
Tier 1 to transition from CFI/BCKDF-funded start-up phase to full TRIUMF ownership, continue annual expansion (requires new premises from 2011)
- Analysis centre at TRIUMF to be used by Canadian and international members to lead T2K analysis and discoveries.
Provide successful operation of T2K.
- With help of DAQ, electronics detector and computing groups at TRIUMF, provide successful operation and analysis for PiENU, ALPHA, and JLab experiments.

Detector and facility developments are crucial for the future

- Working with the detector facility group, develop TRIUMF contribution to the SNOlab projects, which is one of the highest priority projects for the subatomic physics community in Canada.
- Continue R&D for TRIUMF to maintain skill set to contribute to T2K and ATLAS detector upgrades and ILC detectors so Canada continues to lead in cutting-edge international projects.
- Develop the engineering design of the ultra-cold-neutron project, if it were successful in the CFI application.

Theory group plans 2

next exciting era with D. Morrissey and Sonia Bacca
ensure their successful start and help/support in all possible ways

need to improve computing: dedicated theory cluster,
essential for successful research program of new hire and RAs

training future leaders in subatomic theory

increase number of students to 1-2 per scientist

exploit more synergies with experimental program

establish Theory Group as center of activity for the broader
Canadian subatomic theory community

plenary talk at CAP09, invited talks APS NW (at UBC), TC5,...

sabbatical of S. Godfrey, NP Joint Positions Task Force

improve Theory Group web presence

run 3 workshops (LHC theory, lattice QCD, isospin-sym breaking)

Accelerator Division Mission

- Ensure highest availability of TRIUMF accelerators to maximize scientific productivity.
- Pursue new accelerator facilities at TRIUMF.
- Advance our core competencies, create a world-class R&D program and transfer our knowledge to industry.
- Maintain existing and establish new collaborations in national and international projects.
- Establish and maintain a strong graduate student program in Accelerator Physics and Engineering, in collaboration with Canadian universities.

June 4, 2009

Accelerator Division Goals for FY09-10

- **Accelerator Operations and Beam Delivery**
- **ISAC-II Phase II Heavy Ion Linac**
- **Cyclotron Refurbishing**
- **ISAC Target/Source Development**

SRF Development

- **1.3 GHz:**
 - operate 1.3 GHz cryostat test facility
 - Fabricate and test single-cell cavity from PAVAC
 - Begin fabrication of 9-cell cavity from PAVAC
- **Begin prototyping studies for SPL cavity (704 MHz, 5-cell)**
- **Support Anna's thesis project**
- **Write a proposal for fundamental research in SRF R&D using b-NMR (w/Kiefl)**

VECC MoU

- Sign MoU2 with VECC
- Address Director's VECC review recommendations
- E-gun: Measure emittance at 100 keV and test triode mode of operation at 650 MHz
- Design and prototype buncher cavity
- Define Injector cryomodule (by June)
- Design Injector cryomodule (Engineering)
- Prepare e-test area
- Setup high power coupler test station

E-linac

- Complete CDR/TDR
- Initiate proton hall cleanup
- Outline a high power coupler development program
- Complete CFI tasks, if approved.

Nuclear Medicine

- Conceptual design of Mo-99 prototype facility
- Mo-99 demonstration test proposal
- TR13

Technology Transfer

- Pursue flue gas accelerator as a tech transfer R+D project with PAVAC - manpower neutral project

Education

- 9 graduate students in Accelerator Physics at TRIUMF
- Accelerator Physics Course: regular course at UBC and UVic.
- Simplify UVic bureaucracy to accept TRIUMF students.
- Prepare protons/ions course for Winter 2010.

Collaborations

- Clean up our collaborations list.
- Orsay on Li8 tests and target geometry. Compare with simulations.
- Collaboration on HP targets (e.g. LLNL, ORNL, FRIB)
- Kyoto: H- ion source development – Yoshiharu Mori
- PSI: Send a controls or Ops or Beam Delivery person
- CERN: Derive Q_{HOM} specs, sign SPL MOU; begin SPL cavity development, clear up other CERN obligations
- EMMA
- GEANT4

Project Management at TRIUMF

TRIUMF Perspective

- Control access to resources
- Track resource demands
- Track resource usage
- More accountability

User Perspective

- Help project leaders manage projects
- More dependability in accessing resources

Project Management Elements

Commitment List (of all existing projects)

Project Charter Sheets

Program Importance (not priority)

Project Reviews (Gate, Status Reviews)

Time Sheets

Skills Inventory

Microsoft Project

Project Management Web Page

Project Management | TRIUMF : Canada's National Laboratory for Particle and Nuclear Physics

http://www.triumf.ca/triumf-internal/administration/project-management

Canada's National Laboratory for Particle and Nuclear Physics
Laboratoire national canadien pour la recherche en physique nucléaire et en physique des particules

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Project Management

In January 2009, N. Lockyer formed a Project Management Working Group (PMWG). The Group consists of: Iouri Bylinski, Remy Dawson, Jons Dilling, Joao Farrell, Byron Jennings (Chair), Tim Meyer, and Vijya Verma. Its mandate is to determine and help implement the most appropriate project and resource management system for TRIUMF.

With our next five-year plan, TRIUMF is moving into a new era. The plan is ambitious and will provide TRIUMF with a strong future. Fulfilling the promise of the five-year plan will take dedication and careful management of all of TRIUMF's resources. TRIUMF's resources must be distributed to projects and operations in a fair and transparent manner and projects must be managed in a manner to make maximum use of the resources allocated to them. Thus, this is a good time to consider how TRIUMF should manage projects and its resources.

The Working Group has determined that TRIUMF should move towards a *Project Oriented Management System*. In this system, the allocation of any TRIUMF resource will be keyed to a specific project or commitment on an official Commitments List that has been approved by Senior Management. The Commitments are of two types: the first are projects with a definite start and end date, the second are ongoing operational activities. Each of these commitments has an ID number that will be used to track resource allocation. In short, if your project is not on the Commitments List it does not get TRIUMF resources. Starting in April 2009, the TRIUMF time sheets will also use the Commitments List to determine the categories listed. Brief instructions for filling out the time sheets are given [here](#).

The initial Commitments List has been developed with input from the TRIUMF community and approved by TRIUMF Senior Management. Eventually the Commitments List will be a controlled document. The long-term process for adding and removing projects is still under development but a suggested approach is indicated in Table 1. Until the final policies are determined, projects will be added on request from the TRIUMF Director with advice from the Division's Heads.

For project management purposes projects will be divided into three categories based largely on size and impact on TRIUMF. The categories and possible management procedures are given in Table 1. Note that the oversight and review depends on the category of the project.

TABLE 1
Project Categories

Project Category	1	2	3
Characterization	Major Component of Five-Year Plan	Major New TRIUMF Capability or Major Contribution to External Experiment or Facility	Small Project or an Addition to an Existing Facility
Importance	Crucial for TRIUMF's Future	Important for TRIUMF's Future	Useful for TRIUMF's Future
Examples	E-Linac, ARIEL	TIGRESS, TITAN, T2K, EMMA	IRIS, SPICE, DEAP
Initial Approval	Five-Year Plan Review Process	PPAC and the Director and Division Heads	Director and Division Head
Change Control	Director and Division Heads	Director and Division Heads	Director and Division Head
Management Oversight	Director and Division Heads	Director and Division Head	Division Head
Report to Senior Management Meeting	Monthly	Twice yearly or when there is a significant change.	At initiation and when there is a significant change.
Report to PPAC	Twice Yearly	Yearly	At Initiation and Closure

TRIUMF Home Page → Administration → Project Management

<http://www.triumf.ca/triumf-internal/administration/project-management>

Feedback welcomed

Project Management Web Page

Introduction

Commitments List

Project Charter Sheet

Project Categories

Project Phases

Project Approval Criteria (preliminary)

Project Management TSOP (preliminary)

Microsoft Project (Wiki, Remy Dawson)

Skills Inventory

Project Charter Sheet

One Required for each project

Basic information on project

Initiates a project at TRIUMF

All current projects should send a project charter sheet to Byron Jennings by June 16.

Project Category

Category	1	2	3
Characterization	Major Component of Five-Year Plan	Major New TRIUMF Capability or Major Contribution to External Experiment or Facility	Small Project or an Addition to an Existing Facility
Importance	Crucial for TRIUMF's Future	Important for TRIUMF's Future	Useful for TRIUMF's Future
Examples	Useful for TRIUMF's Future	TIGRESS, TITAN, T2K, EMMA	IRIS, SPICE, DEAP
Initial Approval	Five-Year Plan Review Process	PPAC, the Director and Division Heads	Director and Division Head
Change Control	Director and Division Heads	Director and Division Heads	Director and Division Head
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Gate Reviews

Gate Review 1

- Science Assessment, Initial Approval
- Allows access to TRIUMF resources for design studies and project planning

Gate Review 2 (e.g. M20 CFI project June 4)

- Approves Project Plan and Preliminary Design
- Main approval for Detailed Design and Project construction

Gate Review 3 (e.g. T2K/JPARC June 3)

- Project close out, beginning of operations

Science Division Objectives

- Alignment of priorities in preparation for the start of next 5YP
- Maximize ISAC scientific impact (2009-2013)
 - *continue the momentum in new beam development*
 - *increased beam delivery efficiency*
 - *establish routine operation of actinide targets*
- Reallocation of personnel and target new hires
- Identify existing commitments to ongoing projects
- Move towards resource loaded project scheduling
- Full implementation of TRIUMF QMS program
- Engage the new group leaders and deputy leaders
 - both planning and execution of division objectives



Mission statement: ISAC Science

Perform and lead world-class Rare-Isotope Beam Physics experiments in strong collaboration with Canadian and international community

- **Nuclear Astrophysics**
- **Nuclear Structure**
- **Fundamental Symmetries**

Exploit the specialized first class ISAC facilities at TRIUMF required for Canadian scientists & the world-wide community to perform state-of-the-art nuclear physics experiments. This includes development of new RI-beams, detectors, electronics, data acquisition, and data analysis, with a strong emphasis on actinide targets.

Forster international collaborations to attract new first class programs in Rare-Beam Physics to TRIUMF

Train students and young scientists together with Canadian Universities to become leaders in research and industry for the benefit of all Canadians

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Train students and young scientists together with Canadian Universities to become leaders in research and industry for the benefit of all Canadians

ISAC Beam Development priorities for 2009-2013

- **Routine operation with actinide targets in ISAC-I**
 - This is the highest priority of the Science Division
 - Collaborate with accelerator division to move forward the 2nd hot cell and other infrastructure needed to develop actinide targets for full exploitation of Fundamental Symmetries Program and neutron-rich physics potential for approved high priority experiments and as outlined in the TRIUMF 5YP.
 - strongly support new hires in RPG, Remote handling, engineering and science to support this program
- **Routine operation of the Charge State Booster**
 - This is the second priority of the Science Division
 - Collaborate with the accelerator division in the development and infrastructure upgrades required for “clean” high-charge-state radioactive beams with $A > 30$
- **Routine operation with MYSTIC (online ECR source)**
 - This is the third priority of the Science Division

ISAC Science priorities for 2009:

Nuclear Astrophysics:

- Complete at least 2 experiments with TUDA at ISAC-II
- Complete one DRAGON RIB experiments and one experiment using Supernanogan
 - $^{18}\text{F}(p,\gamma)$: measure 665 keV resonance strength for first time, constraining ^{18}F production in novae.
 - $^{17}\text{O}(\alpha,\gamma)$: measure directly to constrain models of low-metallicity rotating massive stars showing possible s-process nucleosynthesis
 - $^{33}\text{S}(p,\gamma)$: measure directly for first time constraining nova sulfur isotopic ratios which may eventually be observed in meteoric grains
- Tech. Developments:
 - EMMA project ramping up:
 - HV power supplies & common support structure design and begin installation
 - TACTIC commissioning

Nuclear Structure:

- First experiment with $A > 30$ RIB from CSB using TIGRESS
- Complete at least one experiment with TIGRESS using SHARC
- First RIB mass measurement using TITAN and highly charged ions
 - Island of inversion investigation around $N > 28$
- First collinear laser spectroscopy experiment using β -NMR
- Tech. Developments:
 - TITAN Manitoba Cooler trap
 - DESCANT a CFI funded neutron detector array

Fundamental Symmetries:

- First super-allowed β -decay program with BR, $T_{1/2}$ and Q-value
- Complete the ^{74}Rb measurements with highest precision
- RnEDM project proof-of-principle measurement demonstrating polarisation of Xe
- Complete exotic particle search with new method using TRINAT
- First UO_2 target experiment
 - β -decay of $^{223-225}\text{At}$ to identify the best candidate for Rn EDM measurement

Tech. Development:

Francium APNC program: design of UHV beam into laser room



Computing Services Plans and Goals 2009

Provide a productive, supportive, reliable and secure computing and networking infrastructure and services for the daily operation of the TRIUMF Laboratory.

Support the existing and develop new services to meet the objectives and demands of the TRIUMF Scientific, Experimental and Administrative programs.

Provide detailed documentation and education of the IT services available to the TRIUMF user community to promote a productive and efficient computing environment.

Establish the means and facilities for collaborating with TRIUMF's national and international peer laboratories, Universities and collaborating partners.

TRIUMF Computing Services (1)

ATLAS Tier1 Center

Mission: *Operate and maintain the 24x7 ATLAS Canada Tier1 Computing Facility at TRIUMF*

Goals for 2009

- Continue 24x7 operation of the Tier1 Data Center. Work on improving the already impressive 98% availability of the center.
- Submit RFP by earlier summer to acquire 2009 CPU & Storage resources as specified in the LHC ATLAS MOU. Install new resources by September 2009
- Upgrade cooling and electrical facilities to support the additional resources

General Scientific Computing GSC

Mission: *Provide the hardware & software resources for the TRIUMF experimental program, Online/Offline scientific programming and application support. Develop and implement modern DAQ systems and techniques as required to meet the challenges of new and demanding experiments.*

Goals for 2009

- This year the following experiments require significant man-power resources, T2K, TIGRESS, DRAGON, DEAP/SNOLAB, TACTIC, Musr/M9A, TITAN.
- Continue the ongoing development and construction of custom DAQ boards (VMEIO, VF48 MSCB) requested by PIENU, Musr, LqXe, TIGRESS...

TRIUMF Computing Services (2)

Core Computing & Networking CCN

Mission: *Provide a productive, supportive, reliable and secure core computing and networking infrastructure and services for the daily operation of the TRIUMF IT demands.*

Goals for 2009

- **Implement a scalable centralised storage-system for core services such as e-mail, web-content, file-sharing, document storage. The system will also enable a high-availability configuration of the many core services which are or will soon be virtualised: Initial capacity will be 10TB.**
- **Replace the site data backup service with a modern and flexible system with increased capacity, retention time and with both near-line and archiving capabilities.**
- **Documentation of user services and a computing groups operating procedures manual.**
- **Complete migration of the two Windows Domains, TRIUMF and TRWIN into a single Windows Domain,**
- **Complete the implementation of building a redundant network core. Review and cost a 10 Gigabit upgrade**
- **Continue the work on documenting and tracking all server services configuration under a revision control system - SVN.**
- **Improve some existing services: wireless, videoconferencing, monitoring and notifications, network access control at TRIUMF House and the visitor network**
- **Increase the Experiment dCache size by 100% to a total of ~100 TB for experiment data**
- **Install network sensors around the site in order to establish and collect performance and reliability metrics.**

TRIUMF Computing Services (3)

Management Information Systems MIS

Mission: *Provide the computing and application support for the TRIUMF administrative services. Provide and support the requirements of the Directors office and Science Division. Maintain the TRIUMF primary web portal.*

Goals for 2009

- **Communications/Directors office:** Electronic Timesheets, Continue support for the TRIUMF Web portal's "new face", Skills CV inventory, Project mgmt tools & software
- **Science Division:** Experiment database, beam scheduling, electronic record keeping of safety approvals
- **Accounting:** Procurement QMS applications, Revise the CPP and EI projection calculations
- **CCN:** Complete database of all TRIUMF users (including visitors, contractors, retirees, students etc) for the purpose of single sign-on authentication, mailing-lists, wireless access etc ...
- **Human Resources:** new modernized web application for managing the HR databases
- **Conferences:** new application for the management of conferences
- and many more from other departments
- **Improvements to the iSeries POWER server to support high availability services.**

CMMS Facility Priorities for 2009

- Complete and commission M9A upgrade
- Complete and commission Liquid He recovery system
 - **in collaboration with Accelerator Division**
- Initiate CFI M20 upgrade project
- Augment internal MMS QA system to provide TRIUMF site compatible documentation
- Further enhance spectrometer capabilities, particularly wrt to unique features.
- Integrate the new NSERC 2009 MRS funding into the CMMS operations.

Project Management Working Group

Iouri Bylinski

Remy Dawson

Jens Dilling

Josie Farrell

Byron Jennings (Chair)

Tim Meyer

Vijya Verma

Honorable Mention

Nigel Lockyer

Shirley Reeve

Mark Keyzer