

TRIUMF



ANNUAL REPORT SCIENTIFIC ACTIVITIES 2002

ISSN 1492-417X

**CANADA'S NATIONAL LABORATORY
FOR PARTICLE AND NUCLEAR PHYSICS**

OPERATED AS A JOINT VENTURE

MEMBERS:

THE UNIVERSITY OF ALBERTA
THE UNIVERSITY OF BRITISH COLUMBIA
CARLETON UNIVERSITY
SIMON FRASER UNIVERSITY
THE UNIVERSITY OF VICTORIA

ASSOCIATE MEMBERS:

THE UNIVERSITY OF MANITOBA
McMASTER UNIVERSITY
L'UNIVERSITÉ DE MONTRÉAL
QUEEN'S UNIVERSITY
THE UNIVERSITY OF REGINA
THE UNIVERSITY OF TORONTO

UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

DECEMBER 2003

The contributions on individual experiments in this report are outlines intended to demonstrate the extent of scientific activity at TRIUMF during the past year. The outlines are not publications and often contain preliminary results not intended, or not yet ready, for publication. Material from these reports should not be reproduced or quoted without permission from the authors.

SEMINARS*

The following seminars were presented at TRIUMF this year.

- 14/01 *Heavy Ions at GSI: Status and Future*, H.-Juergen Kluge, GSI, Darmstadt/U. Heidelberg.
- 16/01 *Chiral Aspects of Hadron Properties Calculated in Lattice QCD*, Anthony W. Thomas, U. Adelaide.
- 17/01 *Would Freud Have Dreamt of It?: How Physics Helps Imaging the Troubled Mind*, Sylvain Houle, PET Centre, CAMH/U. Toronto.
- 31/01 *The TRIUMF-Seattle ${}^7\text{Be}(p,\gamma){}^8\text{B}$ Experiment*, Lothar Buchmann, TRIUMF.
- 06/02 *Spontaneous Broken Space-Time Symmetry and the Goldstone Theorem*, Ian Low, Harvard U.
- 07/02 *Noncommutative Field Theories – a Survey*, Moshe Rozali, UBC.
- 13/02 *Testing the Relativistic Time Dilation With Laser Spectroscopy of Fast Stored Ions*, Gerald Gwinner, MPI, Heidelberg.
- 18/02 *Polarized H^- Ion Source For RHIC Spin Physics*, Anatoli Zelenski, BNL.
- 21/02 *Ideas of The World Beyond*, Erich Poppitz, U. Toronto.
- 22/02 *Long-Range Correlations and the One-Hole Spectral Function of ${}^{16}\text{O}$* , Carlo Barbieri, Washington U., St. Louis.
- 26/02 *Taking a Closer Look at the Dilepton Spectrum of a Quark Gluon Plasma*, Abhijit Majumder, McGill U.
- 28/02 *Nitrogen Absorption by Plant Roots: From Ecology to Molecular Biology With a Lot of Help From ${}^{13}\text{N}$* , Anthony Glass, UBC.
- 01/03 *Fermion Masses and Mixing and CP Violation in a SUSY $SO(10) \times SU(2)_F$ Model*, Mu-Chun Chen, U. Colorado.
- 07/03 *Recent Results From the HIGS Facility*, Henry Weller, Duke U./TUNL.
- 08/03 *Quasideuteron Model and Proton-Neutron Structure in Medium Nuclei*, Alexander Lisetskiy, U. Koln.
- 19/03 *Muon Capture in Liquid H_2 and Solar-Neutrino Scattering on D_2 in Chiral Perturbation Theory*, Shung-ichi Ando, U. South Carolina.
- 21/03 *Recent Results From Super-Kamiokande and K2K*, Kate Scholberg, MIT.
- 25/03 *Accelerators in China and the Proposed RIB at CIAE*, Tianjue Zhang, Chinese Institute of Atomic Energy.
- 28/03 *TUDA at ISAC*, Pat Walden, TRIUMF.
- 04/04 *Measurement of the Weak Mixing Angle $\sin^2(\theta_W)$ in Neutrino and Anti-Neutrino Scattering*, Heidi Schellman, Northwestern U.
- 11/04 *Ion Traps – Precision Measurements and More*, Georg Bollen, Michigan State U.
- 18/04 *Quantum Mass Effects in Muonium Reactivity*, Don Fleming, UBC.
- 22/04 *A Model-Independent Determination of the $K \rightarrow \pi\pi$ Matrix Elements of the Electroweak Penguin Operators Q_7 and Q_8 in the Chiral Limit*, Kim Maltman, York U.
- 25/04 *Self-Shunted Streamer Chamber Spectrometer For Studying Pion Interactions With Light Nuclei at Energies Below the Delta-Resonance*, Gil Pontecorvo, JINR/Torino.
- 26/04 *Quantifying Errors of Stellar Abundance Observables Due to Uncertainties in Nuclear Reactions: Oxygen in Red Giants*, Falk Herwig, U. Victoria.
- 26/04 *Recent Results From SNO*, Neil McCauley, U. Pennsylvania.
- 02/05 *A New Signature For Shell Closures in Nuclei?*, Jutta Escher, TRIUMF.
- 09/05 *The PSI $\mu \rightarrow e\gamma$ Experiment*, Stefan Ritt, PSI.
- 14/05 *The Role of Recoil Separators in Nuclear Structure*, Jo Ressler, Yale U.
- 15/05 *Current Progress of Nuclear Physics Study and BRNBF at CIAE*, Wei-Ping Lui, China Institute of Atomic Energy.
- 16/05 *Precision Measurements of Isotope Shifts, Fine and Hyperfine Structure in Li I & II*, William van Wijngaarden, York U.
- 23/05 *TESLA – a New Tool For Science: High Energy Electron-Positron Collider and X-Ray Free Electron Laser (Scientific Potential and Technical Challenges)*, Albrecht Wagner, DESY/U. Hamburg.
- 30/05 *Supernova Nucleosynthesis, Cosmochronometry and Cosmology*, Taka Nagino and Kaori Otsuki, NAO/Japan, U. Tokyo and Notre Dame.
- 20/06 *Baryon Resonance Spectroscopy From a Novel Improved Fermion Action*, James Zanotti, U. Adelaide.
- 04/07 *New Perspectives on Heavy Quarkonium From Nonrelativistic Effective Field Theories*, Nora Brambilla, U. Milan.
- 18/07 *Heavy Element Research at DUBNA*, Yuri Oganessian, JINR.
- 22/07 *Muon Cooling*, Raphael Galea, Columbia U.
- 01/08 *Nuclear Structure From Scratch*, Erich Ormand, LLNL.
- 07/08 *Precision Low-Energy Measurements and Supersymmetry*, Michael Ramsey-Musolf, Caltech.
- 08/08 *Exploring the Nuclear Halo*, Jim Al-Khalili, U. Surrey.
- 15/08 *Anomalous Redux: Anomalous Projectile Fragments, Their Growth and Decay*, Paul Karol, Carnegie Mellon U.
- 21/08 *A Time Projection Chamber For Physics at the Next e^+e^- Collider*, Madhu Dixit, CRPP/TRIUMF.

- 04/09 *Do the Fundamental Constants of Nature Vary With Time and Distance?*, Victor Flambaum, INT, Seattle/U. New South Wales.
- 19/09 *Alpha-Decay Branching Ratio of Near-Threshold States in ^{19}Ne and the Astrophysical Rate of $^{15}\text{O}(\alpha, \gamma)^{19}\text{Ne}$* , Barry Davids, KVI.
- 26/09 *Status of the ATLAS Calorimeter*, Monica Wielers, TRIUMF.
- 03/10 *Comparison of Source Images For Protons, Pions and Λ Hyperons in 6 A GeV Au+Au Collisions*, Paul Chung, SUNY at Stony Brook.
- 17/10 *Measuring the Shape of the Proton – More Than Just a Sphere!*, Adam Sarty, St. Mary's U.
- 21/10 *A Measurement of Particle Branching Ratios in ^{19}Ne Using a Large Area Silicon Array*, Dale Visser, Yale U.
- 29/10 *Accelerator Production of Radioisotopes at Wisconsin: Methodology For PET and RIB Applications*, Andrew D. Roberts, U. Wisconsin.
- 31/10 *Developments in Plastic Scintillator*, Anna Pla-Dalmau, Fermilab.
- 04/11 *Toward an Italian X-Ray FEL Project: the SPARX Proposal and the SPARC R&D Program at INFN-LNF*, Luca Serafini, INFN-Milan/U. Milan.
- 06/11 *The Canadian Penning Trap Mass Spectrometer – Machine, Method and Measurements!*, Joe Vas, U. Manitoba.
- 07/11 *GANIL Accelerator Facility: Present Status and Future Upgrade*, Marco Di Giacomo, GANIL.
- 13/11 *Operation of Titanium Sapphire Lasers at TRIUMF*, Christopher Geppert, U. Mainz.
- 14/11 *Stochastic Resonance and Human Psychophysics*, Lawrence Ward, UBC.
- 18/11 *Ion Beam Applications at the Ionenstrahllabor Berlin*, Andrea Denker, Hahn-Meitner-Institut, Berlin.
- 21/11 *The New Dimensions of Unification*, Graham Kribs, U. Wisconsin.
- 28/11 *PANDA – Proton ANtiproton at DArmstadt (GSI)*, Klaus Peters, Ruhr-Universität Bochum.
- 29/11 *Single-Ion Penning Trap Mass Measurements With $\Delta M/M \leq 2 \times 10^{-10}$* , Michael Bradley, MIT.
- 10/12 *New Results From KAMLAND*, Stuart Freedman, LBNL.
- 13/12 *GLAST – Mapping the Gamma Ray Sky From Low Earth Orbit*, Richard Dubois, SLAC.
- 17/12 *Ultracold Neutron Production For Experiments With Confined Neutrons*, Yasuhiro Masuda, KEK.

The following lunchtime seminars were presented at TRIUMF this year.

- 10/09 *From Sleeplessness to Nightmares: A Post-Mortem of an EPICS System For a Physics Experiment*, David Morris, TRIUMF.
- 15/10 *TRIUMF Uses a “Lightpath” For High Speed File Transfers to CERN*, Steve McDonald and Corrie Kost, TRIUMF.

* All matters concerning TRIUMF seminars should be referred via e-mail to seminar@triumf.ca

The latest listing of TRIUMF seminars can be seen at <http://www.triumf.ca/seminars/>