

STOP PRESS

Former AECL physicist wins Nobel prize

TASCC salutes the co-winner of the 1994 Nobel Prize in Physics, Bertrand Brockhouse, now retired from McMaster University.

Announced October 12, the prize acknowledges the pioneering work done by Dr. Brockhouse while an AECL physicist here at the Chalk River Laboratories from 1952-1962, as well as the work done by fellow prize-winner Clifford Shull of MIT.

Brockhouse's award reads, "For pioneering contributions to the development of neutron scattering techniques for studies of condensed matter." It is the first Nobel prize for such work in Canada.

Virtually single-handedly, Brockhouse developed the triple-axis spectrometer, the most powerful instrument for thermal neutron inelastic scattering. Such spectrometers are now in use at every major neutron laboratory worldwide. With other CRL workers, Dr. Brockhouse perfected and used the instrument at both research reactors here, NRX and NRU.

As a national laboratory, AECL continues to provide neutron beam facilities at the NRU reactor for a large number of university and industrial researchers, for applications as diverse as medicine, materials science and aerospace.

Facility report

Experiments during September included: an 8π -spectrometer search for superdeformation, irradiation of SIMFUEL samples; tests of cesium-iodide detectors and photodiodes; RCE measurements; cyclotron beam development; precision half-life measurements; tests of an elastic-recoil detector; tests of a heavy-ion counter and tests of AMS time-of-flight detectors.

The Tandem was opened for a three-day replacement of a broken low-energy charging chain which had originally been installed as an emergency spare. It had run 15,000 hours beyond its expected lifetime before failing. The other low-energy chain was also replaced during this opening. A second tank opening was required later to repair a short circuit in a charging lead.

A new cyclotron beam was extracted: gold-197 at 14 MeV per nucleon. This beam has the highest energy of any produced by the TASCC superconducting cyclotron and required the best performance of the electrostatic deflector to date: a gradient of 177 kilovolts per centimetre over a 5 millimetre gap.

Beams produced during September were:

Ion	Energy (MeV)
2H	26
3He	25
18O	657
24Mg	138
27Al	130 & 150
28S	756
127I	64 & 72
197Au	200 & 2758

AMS measures fallout in tree seeds

Members of the AMS group recently investigated the potential of chlorine-36 to date fossil seeds. The group measured the chlorine-36 content in jack-pine and white spruce seeds of known age, provided by the Petawawa National Forestry Institute.

Comparisons of chlorine-36 ratios between 1951 and 1967 in these seeds show an increase of two orders of magnitude, roughly the increase observed in atmospheric chlorine-36 during the same years as a result of global fallout from nuclear weapons testing.

The measurements indicate that the chlorine-36 ratio in seeds does indeed reflect the value in natural precipitation. The shift in the observed maximum ratio from 1957-60 (as observed in precipitation) to 1966-70 (as measured in seeds) may provide insight into the mechanism of plant uptake of trace nutrients.

Fabio Sauli visits CRL

The head of CERN's Gas Detectors Development Group, Fabio Sauli, visited Chalk River Laboratories this month. He was here to attend an international workshop on Advances in Radiation Measurements and to present a talk titled "Applications of Gaseous Particle Detectors in Physics and Medicine."

Sauli worked with 1992 Nobel Prize-winner Georges Charpak in developing multi-wire proportional chambers and drift chambers; he also collaborated in various experiments at CERN and Fermilab.

Since the 1990 retirement of Charpak, Sauli has continued development of advanced gas detectors such as micro-strip gas chambers (MSGC) and optical-imaging chambers. The spread of these technologies to applied fields has increased considerably in recent years.

LN2 demonstrations a hit with fair crowds

Five staff members from TASCC participated in a large local fair this month, first devising then presenting a short cryogenic demonstration to crowds at the 1994 International Plowing Match.

The demonstrators used liquid nitrogen to show some of the properties of various materials at low temperature.

These properties included: brittleness and strength; contraction and expansion of gases; and changes in resistance of electrical wire.

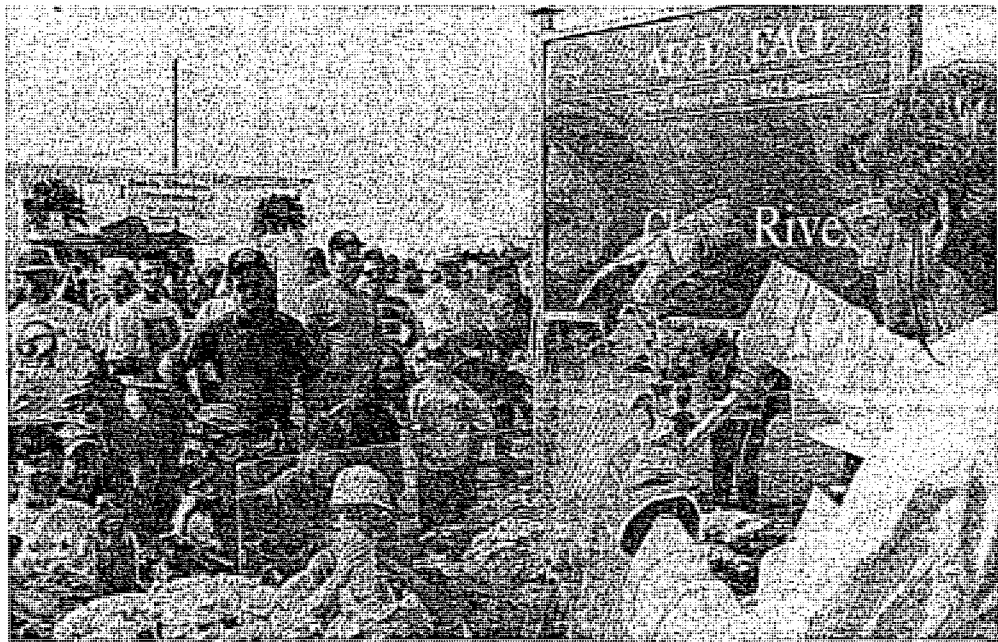
The displays were a highlight at the AECL Research exhibit during the plowing match.

Billed as a "celebration of rural living," the five-day event attracted 125,000 visitors to the area.

This is the first time the match has been held within

several hundred kilometres of CRL and it provided an excellent opportunity to promote TASCC to the public.

The five volunteer demonstrators were: Greg Caldwell, David Caswell, John McKay, Garry Mitchel and Larrie Thomson.



TASCC's Larrie Thomson demonstrates properties of LN2 at the AECL Research exhibit at the 1994 International Plowing Match in Pembroke, Ontario, 20-24 September. Pembroke Observer photo

September experiments

Experiment	Search for superdeformation in europium-145 and promethium-139 with the 8π spectrometer.
Researchers	S. Flibotte and S.M. Mullins (<i>McMaster University</i>); H.R. Andrews, V.P. Janzen, D.C. Radford and D. Ward (<i>TASCC</i>)
Beams	130, 150 MeV ^{27}Al
Duration	4 days
Experiment	Irradiation of SIMFUEL samples to simulate fission-fragment effects in CANDU reactor fuel.
Researchers	P.G. Lucuta and R.A. Verrall (<i>Fuel Materials Branch, CRL</i>); H.R. Andrews (<i>TASCC</i>)
Beam	72 MeV ^{127}I
Duration	2 days
Experiment	Test of thin films in AMS time-of-flight detectors.
Researchers	V.T. Koslowsky, B.F. Greiner and J.W. McKay (<i>TASCC</i>)
Beam	64 MeV ^{127}I
Duration	1 day
Experiment	Response test of new cesium-iodide detectors and photodiodes in the particle chamber.
Researchers	D. Bowman, G.C. Ball, D. Fox, E. Hagberg, D. Horn and A. Galindo-Uribarri (<i>TASCC</i>)
Beams	36.5 MeV/A ^{18}O ; 26 MeV deuterons
Duration	4 days
Experiment	Resonant coherent excitation (RCE) measurements with a silicon beam.
Researchers	J.S. Forster (<i>TASCC</i>); J.A. Davies (<i>McMaster University</i>)
Beam	27 MeV/A ^{28}Si
Duration	5 days
Experiment	Development of gold-197 in the superconducting cyclotron. Extraction of this beam at 14 MeV/A for the first time extends the "proven" area of the cyclotron's mass-energy diagram significantly. However, such a high deflector voltage is required that the beam is not considered routine at present.
Researchers	TASCC Beam Commissioning Team
Beam	14 MeV/A ^{197}Au
Duration	4 days
Experiment	Measurements of the half-life of neon-19 under various conditions.
Researchers	E. Hagberg, V.T. Koslowsky, G. Savard, J.C. Hardy and M.J. Watson (<i>TASCC</i>)
Beams	25 MeV ^3He ; 200 MeV ^{197}Au
Duration	2 days
Experiment	Test of an upgraded heavy-ion counter for pionic-fusion experiments.
Researchers	D. Horn, D. Bowman and D. Fox (<i>TASCC</i>)
Beam	138 MeV ^{24}Mg
Duration	2 days
Experiment	Test of a gas detector for elastic-recoil experiments.
Researchers	J.S. Forster (<i>TASCC</i>); R. Siegele and S. Wallace (<i>McMaster University</i>)
Beam	200 MeV ^{197}Au
Duration	1 day

"Writing keeps me from believing everything I read."

Gloria Steinem, 1993

Next month

- AMS measurements
- DSAM measurements of lifetimes in promethium-129 and cerium-129 SD bands
- Search for collectivity in indium-107
- Cyclotron beam development
- Radiation damage studies
- Study of weak GT branches in nickel-55
- Irradiation of SIMFUEL samples

Facility operating record

Elapsed Time (Year-to-date) 6599h

Beam Available	
Tandem Only	3381.3
Tandem + Cyclotron	467.5
Beam Development	1427.9
Planned Shutdown	717
Forced Shutdown	605.3

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