

1994 April Vol. 8 No. 4

News about Chalk River's Tandem Accelerator Superconducting Cyclotron facility for users and potential users

Printed 1994 May 17

## Penning-trap spectrometer gets go-ahead

NSERC, the Natural Sciences and Engineering Research Council, this month announced approval of funds to build the Canadian Penning-trap mass spectrometer at TASCC.

Described in detail in our 1993 October newsletter, the trap will cost \$1.1 million. NSERC will provide half the funds through the universities of Manitoba and McGill in two installments over two years. Both universities and TASCC will also provide funds of their own.

The three collaborating groups bring particular strengths to the project: Manitoba brings experience in measuring atomic masses; TASCC brings expertise in producing unstable atoms; and McGill brings expertise in using lasers to ionize atoms selectively.

The collaboration will produce unstable atoms, transport them by helium jet, use lasers to selectively ionize the atoms of one isotope of interest, then store them in a Penning trap where precise mass measurements will be made.

The new spectrometer is expected to be ready for operation in about 18 months time.

## Enthusiastic responses from science educators

TASCC has again provided volunteers for the annual Science for Educators Seminar, held this year on April 14-16 at the Chalk River Labs.

Formerly known as the Science Teachers Seminar, the annual event has been running now for 19 years and attracts over 100 enthusiastic science educators from most Canadian provinces. Educators choose from several sessions covering all aspects of research at CRL.

Several TASCC researchers hosted *Afternoon with a Scientist* sessions, in which several educators

## Facility report

Experiments performed included: three  $8\pi$ -spectrometer searches for superdeformation; elastic-recoil detection of light elements in a heavy substrate; a precision measurement of the half-life of neon; measurement of nuclear-reaction time scales; and AMS measurements of the chlorine-36 content in environmental samples.

A momentary loss of electrical power in the local area on Saturday 9 April resulted in a short beam outage during an  $8\pi$ -spectrometer run; the experiment was nevertheless successfully completed.

Beams produced during April were:

Ion	Energy (MeV)
$^{18}\text{O}$	111, 657
$^{12}\text{C}$	65
$^{23}\text{Na}$	120
$^{27}\text{Al}$	152
$^{34}\text{S}$	178
$^{35,36,37}\text{Cl}$	100
$^{70}\text{Ge}$	1575
$^{197}\text{Au}$	124-230

accompanied a scientist during a typical working afternoon.

Six staff conducted detailed tours of the TASCC facility, during which three groups of 10 visitors were each paired with two staff members with differing areas of expertise. "Fascinating, awesome, great, excellent" were some of the responses to these tours.

In addition, high-spin researcher Victor Janzen presented a 70-minute talk on *The Physics of the Atomic Nucleus* and senior scientist Bob Andrews co-presented *Hands-on Experiments with Ionizing Radiation* with Aslam Lone.

## TASCC staff judge science fair

Five staff members from TASCC volunteered to act as judges for the Renfrew County Science Fair, held in Pembroke on Saturday 9 April.

The eager volunteers helped review and judge almost 160 junior science projects submitted by 200 students from the 28 schools in the local area. Four levels of entries in the four categories of Physical Sciences, Life Sciences, Engineering, and Computer Science were assessed.

The three winning projects chosen to advance to higher level competition were: *The Sound of Silence*, *Frozen Fingers*, and *Computers as Digital Meters*.

## AECB inspects us again

Two inspectors from the Atomic Energy Control Board visited TASCC this month for an annual facility safety inspection. They came from AECB head office in Ottawa with a list of 24 items for discussion. The majority of these items were resolved on the spot, some requiring detailed discussion with system specialists.

Although five items need follow-up action, no serious safety or operational issues were identified during the one-day visit.

## April experiments

<b>Experiment</b>	Search for superdeformed bands in erbium-154 with the $8\pi$ spectrometer. Although interrupted by an area power outage, the run was successfully completed. Preliminary analysis reveals evidence of a candidate band.
<b>Researchers</b>	S. Flibotte, G. Hackman, S.M. Mullins, J.C. Waddington and J.L. Rodriguez ( <i>McMaster University</i> ); D. Ward, V.P. Janzen, A. Galindo-Uribarri and D.C. Radford ( <i>TASCC</i> ); J. DeGraaf and M. Cromaz ( <i>U. of Toronto</i> )
<b>Beam</b>	178 MeV $^{34}\text{S}$
<b>Duration</b>	4 days

<b>Experiment</b>	Search for superdeformed bands in europium-142 with the $8\pi$ spectrometer. A band has been identified successfully.
<b>Researchers</b>	S.M. Mullins, S. Flibotte, G. Hackman, J.C. Waddington and J.L. Rodriguez ( <i>McMaster University</i> ); S. Pilotte ( <i>Ottawa University</i> ); D. Ward, V.P. Janzen, A. Galindo-Uribarri and D.C. Radford ( <i>TASCC</i> ); J. de Graaf and M. Cromaz ( <i>U. of Toronto</i> )
<b>Beam</b>	152 MeV $^{27}\text{Al}$
<b>Duration</b>	4 days

<b>Experiment</b>	High-spin spectroscopy of intruder bands in tin-112 with the $8\pi$ spectrometer. Although data collected are somewhat marginal because of beam time being redirected to searches for superdeformation in other species, data of higher quality than previously taken were nevertheless obtained. These provide the level-structure information needed for analysis of DSAM data already in hand.
<b>Researchers</b>	J. DeGraaf, M. Cromaz and T.E. Drake ( <i>U. of Toronto</i> ); S.M. Mullins, S. Flibotte, G. Hackman and J.L. Rodriguez ( <i>McMaster University</i> ); V.P. Janzen, D.C. Radford and D. Ward ( <i>TASCC</i> )
<b>Beam</b>	120 MeV $^{23}\text{Na}$
<b>Duration</b>	2 days

**Experiment** Elastic-recoil detection with a large solid-angle detector for depth profiling of light elements (F, O, C and D) in zirconium-alloy foils; also, further development of the detector, which provides positional information in addition to particle identification and energy information.

**Researchers** J.S. Forster (*TASCC*); J.A. Davies, R. Siegle (*McMaster University*)

**Beam** 124-230 MeV  $^{197}\text{Au}$

**Duration** 2 days

**Experiment** Precise measurement of the half-life of neon-19 with ISOL. The half-life, which is important to fundamental weak-interaction studies was measured with an accuracy of about 0.05%, markedly better than any previous measurement.

**Researchers** V.T. Koslowsky, E. Hagberg, G. Savard, J.C. Hardy and M.J. Watson (*TASCC*)

**Beam** 65 MeV  $^{12}\text{C}$

**Duration** 2 days

**Experiment** Study of fragment-fragment correlations to yield information on the time scale for the reaction of germanium on aluminum; test of Laval counter consisting of a position-sensitive photomultiplier coupled to an array of scintillation detectors; test of prototype scintillator elements for a miniball.

**Researchers** D. Fox, D. Horn, D. Bowman, G.C. Ball, A. Galindo-Uribarri and E. Hagberg (*TASCC*); R. Roy, C. St. Pierre, P. Gendron and D. Doré (*Université Laval*)

**Beams** 22.5 MeV/A  $^{70}\text{Ge}$ ; 36.5 MeV/A  $^{18}\text{O}$ ; 111 MeV  $^{18}\text{O}$

**Duration** 8 days

**Experiment** AMS measurement of chlorine-36 content in 75 environmental samples, which included: tree rings; jack-pine seeds; tap water; melted snow; sandstone; the "Peekskill" meteorite; and samples from the OKLO natural reactor in Africa.

**Researchers** H.R. Andrews, W.G. Davies, B.F. Greiner, Y. Imahori, V.T. Koslowsky and J.W. McKay (*TASCC*); R.J.J. Comett, L.A. Chant, G.M. Milton, S.J. Kramer-Tremblay, J. Jirovec and T. Chaput (*Environmental Research Branch, CRL*)

**Beam** 100 MeV  $^{35,36,37}\text{Cl}$

**Duration** 5 days

Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road.  
STEWART BRAND, US AUTHOR, 1993

## Next month . . . . .

- Development of new cyclotron beams
- Search for Very Extended Minima in tungsten-175
- Measurement of octupole correlations in xenon-114 and tellurium-110
- Irradiation of SIMFUEL samples
- Search for superdeformation in dysprosium-146
- Search for superdeformation in erbium-154
- Annual visit by Nuclear Physics Technical Review Committee

## Facility operating record

Elapsed Time (Year-to-date)	2903 h
Beam Available	
Tandem Only	1643.9
Tandem + Cyclotron	315
Beam Development	490.9
Planned Shutdown	288.5
Forced Shutdown	164.7

Editor: Larrie Thomson  
Tandem Accelerator Superconducting Cyclotron  
AECL Research, Chalk River Laboratories  
Mail Station 49A Chalk River,  
Ontario, Canada K0J 1J0  
Phone (613) 584-8811, extension 4131  
FAX (613) 584-1800  
Internet TASCC@CRL.AECL.CA



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