



1995 June Vol. 9 No. 6

CA9600658

INIS-mf--14866

NEWSLETTER

INIS-mf--
tascc

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

Printed 1995 July 21

1995 TASCC workshop an international success

Fifty five Canadian and international physicists gathered at the Chalk River Laboratories at the end of June to attend the three-day TASCC Workshop on Heavy-Ion Physics Research. Attendees came from as far afield as India, Australia and New Zealand.

Fourteen of the visitors stayed for a further four days to attend David Radford's instructional school on his data-analysis software, known throughout the world's high-spin community as Radware.

This third TASCC Workshop, held June 26 - 28, was timed for the week following the Nuclear Chemistry Gordon Conference in New Hampshire. These dates were instrumental in boosting attendance, as many delegates came directly from the conference.

Two-and-a-half days of invited and contributed talks covered three main areas active at TASCC: high-spin physics, heavy-ion reaction mechanisms, mass measurements and Penning traps.

Invited speakers and their topics were:

Session 1

Chair: D. Horn (TASCC)

W. Trautmann (GSI)

Multifragmentation of excited spectator nuclei

M. Tincknell (Purdue)

Multifragmentation results from the EOS TPC

G. Wozniak (LBL)

Scaling and reducibility in (a)symmetric fission and multifragmentation

K. Tso (LBL)

Reducibility of charge distribution and phase coexistence in multifragmentation

D. Shapira (ORNL)

Role of neutron exchange in fusion of heavy nuclei below the barrier

Facility report

Six experiments were conducted this month: two ERDA (elastic-recoil detection analysis) runs; a projectile-breakup test; an 8π spectrometer study of $A \approx 50$ nuclei; AMS (accelerator mass spectrometry) measurements and a cyclotron beam-development run.

A week-long facility shutdown was scheduled mid-month for general maintenance. In particular, the Tandem, which has not received major work since 1994 October, was opened for cleaning, inspection and repair. However, a brief tank opening was required a week later to remove broken pieces of leader-line which were causing tank sparks.

Cyclotron beam development led to the extraction of germanium-76 at 12 MeV per nucleon for the first time. Three other beams were optimized for future production.

Beams produced during June were:

Ion	Energy (MeV)
protons	10-15
^4He	10-35
^{12}C	540
^{18}O	657
^{24}Mg	1080
^{28}Si	120
^{32}S	90-120
^{35}Cl	1505
$^{35,36,37}\text{Cl}$	100
^{76}Ge	912
^{127}I	50
^{197}Au	250
^{208}Bi	230

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Session 2

Chair: J.C. Waddington (McMaster)

T.L. Khoo (Argonne)

Physics from the decay of superdeformed bands

S.M. Mullins (McMaster)

Superdeformation in ^{145}Tb and ^{145}Gd

W. Korten (Bonn)

Superdeformation in ^{196}Pb

S.Q. Shang (LBL)

Laser trapping of short-lived radioactive atoms for precise measurements in weak interactions

R. Bark (NBI)

Intruder bands at high spin in Re and Ir isotopes: deformation changes and interactions at the alignment of $i_{13/2}$ neutrons.

R.S. Chakrawarthy (Tata)

Intruder bands in $^{112,115}\text{Sb}$

Session 3

Chair: K.S. Sharma (Manitoba)

H.-J. Kluge (GSI)

Recent progress in precision mass measurements

B. Moore (McGill)

The cooling and bunching of a DC beam by buffer gas collisions in RFQ devices

J. Crawford (McGill)

Laser spectroscopy in RFQ traps

D. Pritchard (MIT)

Precision nuclear mass measurements using ion traps

S. Flibotte (McMaster)

Pre-equilibrium isospin effects in the population of giant dipole resonances

J. Sears (SUNY)

Search for smooth band termination in ^{116}Te

Session 4

Chair: A. Poletti (Auckland)

A. Wuosmaa (Argonne)

Analysis of complex reactions using silicon strip detectors

B. Nyako (ATOMKI, Hungary)

Development of CsI-detector system for EUROBALL

Session 5

Chair: C. St-Pierre (Laval)

L. Sobotka (Washington U)

Intermediate-energy necking and other sultry topics

R. Laforest (Caen)

Recent results with INDRA: Ar + KCl and Xe + Sn reactions

Y. Larochelle (Laval)

Dependence of reaction mechanism on IMF production in 'light' heavy-ion collisions at intermediate energy

J. Alexander (SUNY)

Emission times for light particles and fragments: $1360\text{ MeV }^{40}\text{Ar} + \text{Ag}$

L. Beaulieu (Laval)

Fragment production in ^{35}Cl projectile breakup

M. Samri (Laval)

Time scale in magnesium projectile fragmentation at 25A and 35A MeV

In addition, the program included 16 shorter talks and an informal discussion session on the Tuesday afternoon where delegates divided into three groups for "bear-pit" sessions and informal presentations.

Delegates, local hosts and families enjoyed a fine barbecue at the Deep River Yacht & Tennis Club, Tuesday evening.

The TASCC Workshop was sponsored by AECL and organized by a committee comprising: Ian Towner (chair), David Bowman, Alfredo Galindo-Uribarri, Vern Koslowksy and Harlene Yeas (secretary).

Contract signed for SEE work

A contract has been signed with NRL (Naval Research Labs) for the supply of TASCC beam time for SEE (single-event effects) studies on micro-electronics. The research involves ground-based simulation of cosmic radiation as experienced in the US space program. TASCC will provide heavy-ion beams from 50 MeV up to 2.5 GeV in the low-flux range required for this work.

The contract runs for three years from 1995 January and could involve up to 432 hours of TASCC beam time.

June experiments

Experiment Trace surface analysis of ion-source components with ERDA (elastic-recoil detection analysis) techniques.
Researchers V.T. Koslowsky, H.R. Andrews, W.G. Davies, Y. Imahori and J.W. McKay (*TASCC*);
Beam 250 MeV ^{197}Au
Duration 2 days

Experiment Projectile-breakup for a high-energy chlorine nuclei on a gold target.
Researchers D. Bowman, G.C. Ball, D. Fox, E. Hagberg, D. Horn and A. Galindo-Uribarri (*TASCC*); R. Roy, A.-L. Baz, L. Beaulieu, P. Gagné and S. Zakaria (*Université Laval*); N. Colonna and M. Sacchetti (*BARI, Italy*)
Beam 43 AMeV $^{35}\text{Cl}^{+16}$
Duration 4 days

Experiment Spectroscopic study of $A \approx 50$ nuclei with the ALF detector and the 8π spectrometer.
Researchers J. Cameron, M. Gupta, D. Hyde, J. Jonkman, J. Wilson and S.M. Mullins (*McMaster University*); A. Galindo-Uribarri, D.C. Radford and D. Ward (*TASCC*)
Beams 10-15 protons; 120 MeV $^{28}\text{Si}^{+9}$; 90-120 MeV $^{32}\text{S}^{+9}$; 10-35 MeV $^4\text{He}^{+2}$
Duration 4 days

Experiment Heavy-ion ERDA (elastic-recoil detection analysis) of: dinosaur bone fragments; thin group-IV optoelectronic ternary alloys; Co/Ti silicide layers on silicon; oxygen contamination level in a used thin carbon target, and depth-distribution measurements of elements in various zirconium alloys
Researchers J.S. Forster (*TASCC*); J.A. Davies, R. Siegele and S.G. Wallace (*McMaster University*)
Beam 230 MeV $^{209}\text{Bi}^{+15}$
Duration 1 day

Experiment AMS (accelerator mass spectrometry) determination of I-129 concentrations in vegetation samples and Cl-36 concentrations in seeds, tree rings, Chernobyl soil and Cigar Lake ore.
Researchers R.J.J. Cornett, L.A. Chant, G.M. Milton and S.J. Kramer-Tremblay (*Environmental Research Branch, CRL*); H.R. Andrews, W.G. Davies, Y. Imahori, V.T. Koslowsky, J.W. McKay and J.C.D. Milton (*TASCC*)
Beams 50 MeV ^{127}I ; 100 MeV $^{35,36,37}\text{Cl}$
Duration 5 days

Experiment Cyclotron development and first extraction of germanium-76 at 12 MeV per nucleon. This is beam #92 from the cyclotron. Optimization of oxygen-18 at 36.5 MeV per nucleon, carbon-12 at 45 MeV per nucleon and magnesium-24 at 45 MeV per nucleon
Researchers TASCC Beam Commissioning Team
Beams 12 AMeV ^{76}Ge ; 36.5 AMeV ^{18}O ; 45 AMeV ^{12}C ; 45 AMeV ^{24}Mg
Duration 5 days

"THE BIBLE AND THE CONSTITUTION ARE USEFUL ONLY TO THOSE WHO BELIEVE IN THEM.

—A COMPANY MISSION STATEMENT IS THE SAME.

MISSION STATEMENTS DO NOT BY THEMSELVES CREATE A SENSE OF MISSION."

PHILIP SADLER, "THE DIRECTOR MAGAZINE", LONDON, JULY, 1993

Next month

- Study of the reaction mechanisms of high-energy magnesium ions on a gold target
- First tests of the laser ion source
- Production tests of cesium-117
- Radiation damage studies of biomolecules
- ERDA (elastic-recoil detection analysis)
- Study of Coulomb excitation in osmium-192
- Production tests of *n*-rich isotopes

Facility operating record

Elapsed Time (Year-to-date) 4224 h

Beam Available	
Tandem Only	1707
Tandem + Cyclotron	780.5
Beam Preparation	665
Beam Development	353
Planned Shutdown	466
Unplanned Shutdown	252.5

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