



American Association of Physics Teachers

Ontario Section FIFTH ANNUAL CONFERENCE

University of Waterloo

June 17 & 18, 1983

Program at a glance

Thursday, 16 June

8:00-12:00 Early registration and pre-conference Reception - Village 2 (cash bar).

Friday, 17 June

8:45-9:00 Registration in the Foyer of the Physics Building, University of Waterloo.

9:00-9:15 Opening remarks and welcome. Rm. 145 - Physics Building.

9:15-10:15 Roger H. Stuewer, School of Physics & Astronomy, Univ. of Minnesota "The Discovery of the Compton Effect".

10:15-11:00 Coffee, discussion & physics exhibits.

11:00-12:15 Contributed papers A1-A4.

12:15-2:00 Lunch in Village 2.

2:00-3:00 George Brenciaglia, Ontario Hydro, "Ontario Hydro's Nuclear Power Generation Program".

3:00-3:30 "New Developments in Physics Teaching at the Provincial, National and International Levels" - George Kelly.

3:30-4:15 Coffee, discussion & exhibits.

4:15-5:15 My Favourite Demonstration/Reviewing Physics Software for the Microcomputer, Neves Periera, George Kelly, Doug Abe.

5:30-6:30 Pre-Banquet Reception & Mixer (cash bar) St. Jerome's College.

6:30-8:00 Annual Conference Banquet

8:00-9:00 Conference Keynote Speaker, Mr. John J. McDermott, Dept. of Education, Commonwealth of Pennsylvania, "The Events at Three Mile Island and Their Effects Upon the American Public".

9:00-11:00 Informal Discussions & Reflections.

Saturday 18 June

9:00-10:15 Contributed Papers B1-B4.

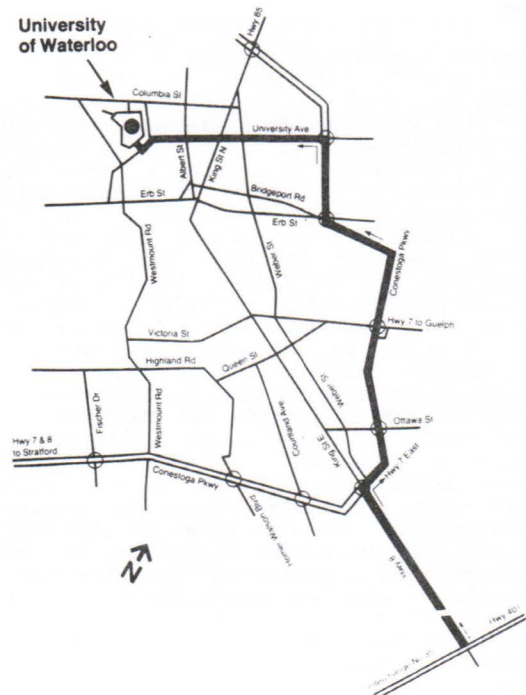
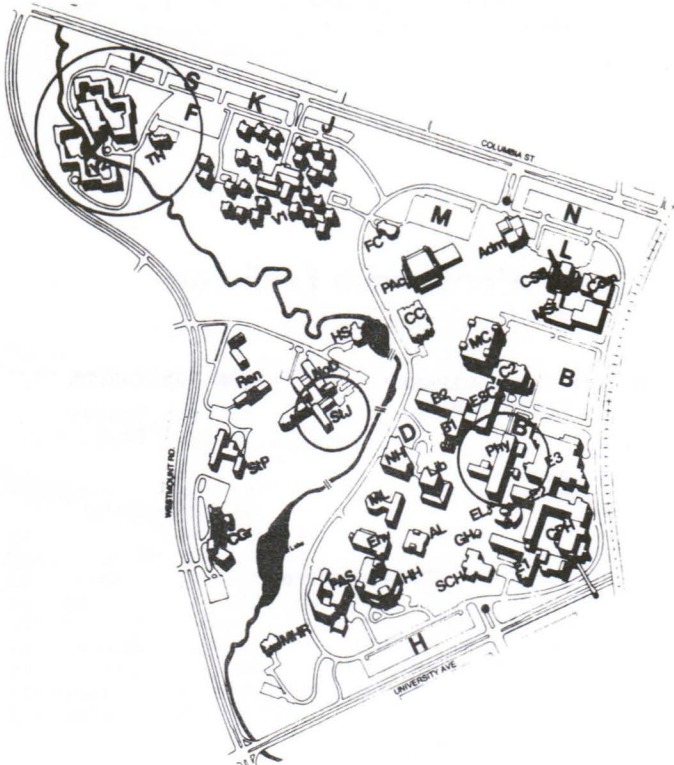
10:15-11:00 Coffee & discussion.

11:00-12:00 "A Decade and a Half of SIN", P. C. Eastman, Dept. of Physics, University of Waterloo. "Jobs for Physics Grads", J. Earnshaw, V.P. Admin. & Finance, Trent University.

12:00-1:45 Lunch

1:45-3:00 Contributed Papers C1-C4.

3:00-3:15 Conference Wrap-Up.



General Information

The Fifth Annual Conference of the Ontario Section of AAPT will be held on June 17 & 18, 1983, at the Department of Physics, University of Waterloo, Waterloo, Ontario.

EARLY REGISTRATION & PRE-CONFERENCE RECEPTION:

Registration for residence and the Conference will begin at 8:00 p.m. Thursday 16 June in Village 2 residence at the University of Waterloo. The annual pre-conference reception and good-time get-together will also take place in Village 2, commencing at 8:00 p.m. Registration facilities will close at 9:30 p.m., but the reception will proceed until midnight. Plan to check in on Thursday evening, meet your friends and get caught up on the latest news!

REGISTRATION

Conference registration for those not in residence (or those checking in on Friday) will take place in the foyer of the Physics Building at Waterloo beginning at 8:45 a.m. on Friday 17 June. Conference parking for residents is available in lots near Village 2. Commuter parking for non-residents is available for 50¢ per day. Confirmation will be sent to all registrants.

Please send your registration to Ken Woolner, Dept. of Physics, University of Waterloo, by June 1, 1983.

CONFERENCE MEALS

The package of accommodation plus meals is outlined on the registration form. For those commuting to the conference, meals are available. Meal tickets will be provided at registration.

BANQUET

The Annual Conference Banquet will be held at St. Jerome's College on Friday evening. A reception (cash bar) will be held from 5:30 - 6:30 with the meal starting at 6:30. We are privileged to have as keynote speaker for the conference Mr. John J. McDermott of the Department of Education, Commonwealth of Pennsylvania, who will speak on The Events at Three Mile Island and their Effects upon the American Public. Mr. McDermott was part of the team sent to investigate the incident and will provide a complete review of this monumental event. The banquet is not limited to conference registrants. Bring a guest! Banquet tickets \$20.

COMPUTER PROGRAM EVALUATION AND EXCHANGE

Following a discussion and evaluation of available microcomputer software, facilities will be made available for the perusal and exchange of physics programs for PET, Apple and IBM microcomputers. Bring your best program on a protected disk (or tape) and a blank disk to participate in this activity.

Conference Features

-Pre-Conference Reception-Thursday evening.

-Banquet Speaker

John J. McDermott tells all about Three Mile Island & its Aftermath.

-Bring your favourite demonstration & micro-computer program and exchange with others.

-Invited speakers

Professor Phil Eastman-Waterloo-on "SIN"
Professor John Earnshaw-Trent-on Jobs for Physics Grads.

Professor Roger Stuewer-Minnesota-on the History of the Compton Effect.

Mr. George Brenciaglia-Ont. Hydro-on Nuclear Power Generation in Ontario.

Keynote Speaker

THE EVENTS AT THREE MILE ISLAND AND THEIR EFFECTS UPON THE AMERICAN PUBLIC

John J. McDermott, Dept. of Education, Commonwealth of Pennsylvania, 333 Market Street, Harrisburg, Pa. 17109

This is an hour-by-hour account of the worst nuclear accident to date. Mr. McDermott helped man the Pennsylvania Emergency Management Agency Command Post in Harrisburg during the accident. The accident is described in detail, and comparisons are made of the risks of generating electricity via nuclear power and other energy sources. Events since the accident will be discussed, and a videotape of the damaged core will be shown.

Conference Exhibitors

SCIENTIFIC EQUIPMENT SUPPLIERS

Merlan Scientific
Sargent-Welch
Scientific

BOOK PUBLISHERS

Addison-Wesley
John Wiley & Sons, Inc.

"MORE TO COME"

Invited Speakers

Session A

THE DISCOVERY OF THE COMPTON EFFECT

Roger H. Stuewer, School of Physics and Astronomy, University of Minnesota, Minneapolis, Minnesota

The discovery of the Compton Effect by Arthur Holly Compton in late 1922 provided the first conclusive experimental proof for Einstein's light quantum hypothesis of 1905, and it was a key experiment leading to the creation of modern quantum mechanics in 1925-26. This lecture will first describe pertinent historical developments in physics between 1905-1916, before Compton received his Ph.D. degree, and will then trace in some detail the long and difficult route traveled by Compton between 1916 and 1922 which led him to his famous discovery.

ONTARIO HYDRO'S NUCLEAR POWER GENERATION PROGRAM

John Brenciaglia Mgr., Fuels & Physics Dept., Ontario Nuclear Services, Ontario Hydro.

A DECADE AND A HALF OF SIN

P. C. Eastman, Dept. of Physics, University of Waterloo

A short history of the Sir Isaac Newton Physics Test for the past fifteen years will be presented. Sample questions from selected SIN tests will be presented (some good, some bad and some undefined - including the seven deadly SINS!) Winners for 1983 will be announced, with discussion to follow.

JOBS FOR PHYSICS GRADUATES

John Earnshaw, Vice President, Administration & Finance, Trent University.

Many high school students have little knowledge of the career paths followed by Physics graduates. Data accumulated over fifteen years shows that there is a wide variety of careers in which a physics background is of use. Examples will be presented which challenge the myth that physics is useless compared to other fields. Evidence exists showing that there will be increasing demand for physicists during the balance of the '80s.

"FLUIDIZED BED" HEAT EXCHANGER PHENOMENON - A WINTER DRIVING HAZARD

Syed Ziauddin, Laurentian University, Sudbury, Ontario, P3E 2C6

Fluidized bed as a heat exchanger has greatly increased the efficiency of the extraction of energy from incinerators, for useful purposes. Winter driving conditions could suddenly produce a situation similar to a fluidized bed, which, with the same rapidity, fog up the windshield of a moving vehicle completely, thus creating a serious hazard.

SCIENCE TOURING THROUGH BRITAIN

Don Stephen, Barrie Central Collegiate, Barrie, Ontario

Places of scientific interest hold secrets about the scientists' personalities that are fascinating to both students and teachers alike. Some of these secrets are revealed in this slide-accompanied presentation about Newton's home at Woolsthorpe, Darwin's home at Downe and the Universities of Cambridge, Oxford and Manchester. Also, solutions to problems encountered in touring sites of scientific interest in Britain are discussed. Finally, the audience will be invited to exchange their favourite stories about science personalities or places of scientific interest throughout the world.

A SIMPLE SPEED OF LIGHT EXPERIMENT

Mats Selen, Innes K. MacKenzie, Dept. of Physics, University of Guelph, Guelph, Ontario, N1G 2W1

An intuitively simple experiment has been developed which measures the speed of 2.42 picometre photons (annihilation gamma rays), by timing their flight over a known distance. The experiment simultaneously tests Einstein's second postulate: that the speed of light is independent of the speed of the source. The data for determining "c" to within five percent of the accepted value can be acquired in less than one hour. This, together with the fact that data analysis is very straightforward, makes the experiment ideal for an undergraduate second year laboratory.

THE SEPTEMBER 1984 SCIENCE GUIDELINES

Brenda Molloy, Bayridge S.S., Kingston, Ontario

The Ministry of Education is rewriting the Science Guidelines from grade seven to grade thirteen (OAC). A nine-member Project Planning Team, under the direction of Jack Bell and Don Garratt, have been in session since November 1982. The process being used and some of the draft materials produced will be presented and discussed, with emphasis being placed on the Physics sections.

Session B

MEASURING THE SPEED OF ELECTRONS IN SOLIDS WITH MICROCURIE SOURCES -- A NEW UNDERGRADUATE EXPERIMENT

John Root and Innes K. MacKenzie, Dept.
of Physics, University of Guelph, Guelph,
Ontario, N1G 2W1

The systems normally used for measuring Compton profiles require the use of hazardous source strengths and long counting periods which are incompatible with undergraduate experiments. A new configuration permits the measurement of profiles of good statistical precision and high resolution with counting times of about 10 minutes while using gamma ray sources - 100 μ Ci. Examples will be chosen from metals (where the Fermi energies are usually obvious), commercial polymers and semiconductors. Sensitivity to crystal orientation will also be demonstrated.

THE USE OF "MX" NOTATION TO SIMPLIFY AND SOLVE PROBLEMS INVOLVING MANY VARIABLES

George Kelly, L. B. Pearson C. I., Scarborough, Ont.

The process of solving problems involving a variation can be greatly simplified by the recognition of the "mx" property of each variable. Using this "mx" utility, algebraic variations are simplified and generalizations are easily demonstrated. A special solution format that utilizes this property will be discussed with examples shown. By getting the student to think along "mx" lines we can effectively enhance their abilities for "formal thinking". This "utility" can become an effective part of a student's solution techniques with many applications across the field of Physics.

INTRODUCING THE PRINCIPLES OF PHYSICS TO ELEMENTARY STUDENTS

Doug Cunningham, Bruce Peninsula D.H.S.,
Lions Head, Ontario.

A program designed by senior science students which uses the idea of a Science Circus to present Physics principles to Elementary School students has been developed at Bruce Peninsula D.H.S. Results and overall impressions from the first version of this exciting idea for science teaching will be presented.

Session C

A REVIEW OF THE AAPT-ONTARIO GRADE 11 PRIZE EXAM

Doug Fox, Belle River D.H.S., Belle River,
Ontario, N0R 1A0

The results of the 1983 AAPT-Ontario Grade 11 prize exam in physics will be presented. Some background on this increasingly popular physics exam will be covered and the future prospects and implications for the Ontario Section will be discussed.

EVALUATING PHYSICS SOFTWARE

Paul McHoull, Chairman, STAO MSC, 3149
Windwood Dr., Mississauga, Ontario, L5N
2K4

The criteria developed by the STAO Micro-computer Studies Committee for the evaluation of physics software will be described. Some experiences gained in evaluating public domain software for the Toronto Board of Education will also be related. Some examples of the best (and some of the worst!) programs will be displayed during the presentation. Several disks of physics programs for the PET micro-computer will be available for copying (all are public domain material). Evaluation forms for those persons willing to review computer programs for STAO will be available.

A LITTLE PUNK ROCK FOR YOUR GENERAL LEVELS

Bob Orrett, Cawthra Park S.S., 1305 Cawthra
Road, Mississauga, Ontario, L5G 4L1

The teaching of sound, electricity and magnetism is often very abstract for general level students. It must be applied in some meaningful way. The study of stereo sound equipment not only works well as an application of physics, but seems to be a topic that teenagers are particularly keen to learn. The author will describe how he has used this idea to enhance a general level grade eleven physics program.

HALLEY'S COMET, LIGHT PRESSURE, AND THE LORENTZ FORCE

N. Gauthier and P. Rochon, Dept. of Physics,
Royal Military College of Canada, Kingston,
Ontario

Halley's comet will visit Earth again in 1986. This momentous occurrence fascinates people so much that every visit since the year 240 B.C. has been recorded in one form or another, the only exception being in 163 B.C. We must prepare our students for this unique scientific experience. The present paper discusses the effect of light pressure on the comet's tail. Kepler had originally conjectured, more than 364 years ago, in 1619, that sunlight causes comets' tails to generally point away from the sun. Maxwell's theory of light gives us a quantitative understanding of how this occurs. However, traditional presentations, being based on Maxwell's stress tensor, are too advanced for a late secondary or early undergraduate level. In this paper, we present an elementary proof that light exerts pressure in its direction of propagation. Newton's second law for an ion in an electric and a magnetic field is solved simply. The solution indicates that the ion drifts in the direction of propagation of the incident light and so explains why comets' tails point away from the sun.

REGISTRATION FORM

Name: _____

Home Address: _____

Business Address: _____

Home Phone: _____ Business Phone: _____

MEMBERSHIP RENEWAL

Membership in A.A.P.T. (Ontario Section) costs \$5.00 per year (Still a Bargain!)

- () I wish to renew my membership for the 1983-84 year
- () I wish to become a member for the first time!
- () I have already paid my \$5.00 membership for 1983-84

CONFERENCE REGISTRATION

- () 1 Day, AAPT-Ont. member \$ 15.00 () 1 Day, non member \$20.00
 - () 2 Days, AAPT-Ont. member \$ 20.00 () 2 Days, non member \$25.00
 - () I plan to contribute a demonstration in the session 'My Favourite Demonstration'
- Title of my Demonstration _____

ACCOMMODATION AND MEAL RESERVATION

Accommodation and meals will be at Village 2, University of Waterloo. Please prepay both accommodation and meals. Meal tickets will be provided when you arrive on campus.

Arrival at residence: Date: June _____ time: _____

Departure: Date: June _____ time: _____

ACCOMMODATION AND MEALS

(Breakfast and Lunch) Single room: \$27.20 (for _____ nights = \$ _____
 Twin room: \$23.00 (for _____ nights = \$ _____

If you have requested twin accommodation, please give room-mates' name _____

COMMUTER MEALS: (No overnight accommodation)

	Breakfast (\$4.00)	Lunch (\$5.00)	Banquet (\$20.00)
Friday, June 17	_____	_____	_____
Saturday, June 18	_____	_____	_____

TOTAL REGISTRATION FEES

Membership (1983-84) \$ 5.00
 Conference registration \$
 Accommodation and meals \$
 TOTAL \$

NOTE:

DEADLINE FOR REGISTRATION IS
 JUNE 1ST !

Please send a check or money order, payable to AAPT-ONTARIO, for the above total along with this registration form to: Prof. Ken Woolner, Department of Physics, University of Waterloo, Waterloo, Ontario. N2L 3G1