



NEWSLETTER

Ontario Association of Physics Teachers

February 2005

The 27th Annual OAPT Conference

Thursday, May 26 to Saturday, May 28, 2005

Laurentian University, Sudbury Ontario



We hope you'll plan to attend

On behalf of the local committee, I invite you to come to Sudbury for what should be a great conference.

We are working hard on the program – some highlights are given inside this newsletter – our facilities for hosting the conference are excellent, and we have planned field trips to the **Sudbury Neutrino Observatory**, to **Science North** and its **Dynamic Earth** underground facility and to explore the unique **Sudbury Basin** which hosts Canada's largest mining camps. Keynote talks will include SNO and physics of our area and the workshop themes include climate change and astronomy.

University residence accommodation and car pooling should help keep costs down, and Sudbury is only a four hour drive from Toronto with some great scenery late in May.

In this newsletter, we outline the program for the conference and give some background on the university,

the Sudbury region and the facilities you may visit when you come.

Please visit the conference web site:

www.physics.uwo.ca/news/conferences/oapt_2005
for updated program, workshop and field trip information.

You can register from March 4th onward, using an Excel[®] spreadsheet form from our host website:
www.laurentian.ca/physics/oapt2005

General enquiries about the conference, and any registration and accommodation forms should be sent to oapt2005@laurentian.ca

We look forward to seeing you in Sudbury in May.

Doug Hallman, Chair
Department of Physics & Astronomy
Laurentian University
(705) 675-1151 Extension 2202
FAX (705) 675-4868

The Conference Program and Schedule at a Glance (preliminary)

Thursday, May 26

1:00 pm – Early bird tour A of SNO
3:00 – 7:00 pm – Registration – Fraser Cafeteria
5:30 pm – Barbeque – grounds of Science North
7:00 – 9:00 pm – Workshops
9:00 pm – Wine and Cheese welcome reception & tour of Science North.

Friday, May 27

7:30 – 8:45 am – Breakfast – Great Hall
Exhibits and poster session open
9:00 am – Welcome – Fraser Auditorium
9:10 am – SNO & SNOLAB – Canada's unique contributions to particle astrophysics.
10:10 am – Keynote theme 2
10:40 am – coffee and exhibits/posters - cafeteria
11:05 am – Session 2 A,B,C
Contributed papers – Fraser classrooms
11:40 am – Session 2 D,E,F
Contributed papers – Fraser classrooms
SNO Tour field trip B
12:10 pm – Lunch and exhibits/posters - cafeteria
1:15 pm – Tours
- Science North & Dynamic Earth
- SNO Tour field trip C
- Sudbury Basin
5:00 pm – plenary session
6:00 pm – reception – cafeteria
6:30 pm - Banquet
8:30 pm – *Einstein: A Stage Portrait* – Tom Schuch
Fraser Auditorium

Saturday, May 28

7:30 – 8:45 am – Breakfast – Great Hall
Exhibits and poster session open
9:05 am – Physics of Mineral Exploration & Mining
10:10 am – Keynote theme 3
10:40 am – coffee and exhibits/posters
11:05 am – Session 4 – contributed/invited papers
OAPT business meeting
12:10 pm - Lunch
1:15 pm – Session 5 – contributed/invited papers
4:15 pm – *The Great Give-Away*
4:30 pm – End of Conference

Workshops

With the OAPT Executive, we are in the process of finalizing plans for the workshops. Suggestions are welcome. When the program is finalized, we will ask you to give your order of preference for the alternatives

available, with choices assigned according to your date of registration – please register early.

Current workshop list (preliminary)

- Climate Change (Science North personnel)
- Astronomy (P. Legault, Doran Planetarium)
- Teaching Motion (Jim Ross, London)
- Einstein in the Classroom

Field Trips

• Sudbury Neutrino Observatory

Two groups of 16 visitors each will tour the SNO laboratory on Friday afternoon, 2000 m underground at INCO's Creighton Mine, about 25 minutes from the Laurentian Campus. We'll also have an early bird tour on Thursday afternoon. Visitors must wear mine coveralls/safety equipment, walk about 1.5 km underground to the lab and shower/change to cleanroom gear at the lab. Contact lenses are not allowed underground, safety glasses (over regular glasses) will be supplied. Register early to ensure yourself a place. We will have a separate tour for local teachers after the conference.

• Dynamic Earth Visit

Dynamic Earth is Science North's new feature at the Big Nickel site in the west end of Sudbury. An underground visit gives a history of mining in the area and shows the equipment and techniques used then and now. Displays give the latest developments in mining and earth science.

• Sudbury Basin Tour

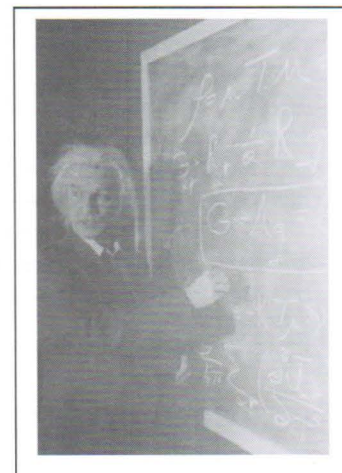
A bus tour will take visitors to key places in the unique Sudbury Basin (see a description of this structure below), and highlight the unique geology and Sudbury's award winning reclamation/regreening work in the region.

Einstein: A Stage Portrait

On Friday evening, after the banquet, we will present actor Tom Schuch in his much-acclaimed one person show: **Einstein: A Stage Portrait**, written by Willard Simms. See Tom's web site (www.spoli.com) for lots more information about this unique show, perfect for the World Year of Physics in 2005.



"The perfect balance of entertainment and education"



The Local Organizing Committee

Doug Hallman, Laurentian University – co-chair
Robert Leclair, Laurentian University – co-chair
Gennady Chitov, Laurentian University
Aaron Barry, Sudbury District Catholic School Bd.
Terry Luoma, Rainbow Board of Education
Teresa Kneller, Astronomer, Science North

Laurentian University

Founded in 1960, Laurentian University is Northeastern Ontario's bilingual comprehensive university. With 8200 full & part time students and a full range of academic programs, it serves a wide local area and attracts students to specialty programs from across Canada and internationally. Laurentian is ranked 35th in research funding among Canadian universities with over \$ 12 million annual funding, and it has recently introduced three Ph.D. programs, in addition to Master's programs across many disciplines. In the fall of 2005, a full class of medical students will begin study in a new building at the Northern Ontario School of Medicine – a joint venture with Lakehead University in Thunder Bay. The campus adjoins two lakes and has residence accommodation for over 1000 students, and full recreational facilities including an Olympic size pool as well as hiking and cross-country skiing trails. Research links are established with the nearby Northeastern Ontario Regional Cancer Centre, the Ontario Geosciences Centre and mining companies and the Cooperative Freshwater Ecology unit.

The J.N. Desmarais library (left) and the H.J. Fraser Science Complex (centre and right) which houses the Physics Department at Laurentian.

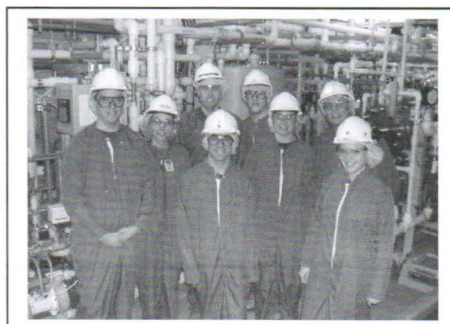


The **Department of Physics & Astronomy** has B.Sc. programs in Physics, Biomedical Physics and Radiation Therapy (in partnership with the Michener Institute), as well as an M.Sc. graduate program. Facilities include the 72 seat Doran Planetarium, two telescope observatories, links with radiation physics research at the Cancer Centre and access to SNO and SNOLAB. Research is focused in the areas of Particle Astrophysics (SNO and SNOLAB, including new double beta decay and dark matter experiment development), medical physics (radiation therapy, nuclear medicine and x-ray scatter imaging) and condensed matter research in

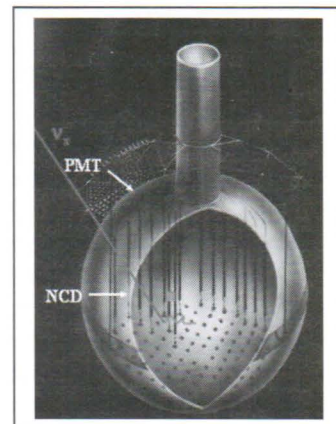
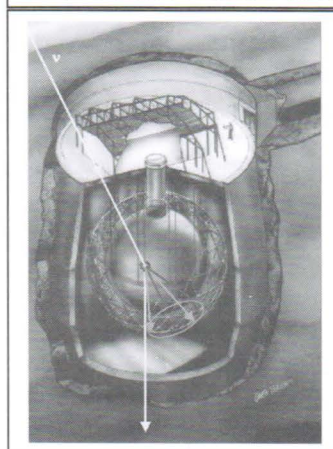
correlated fermion systems and high T_c superconductor theory.

The Sudbury Neutrino Observatory,

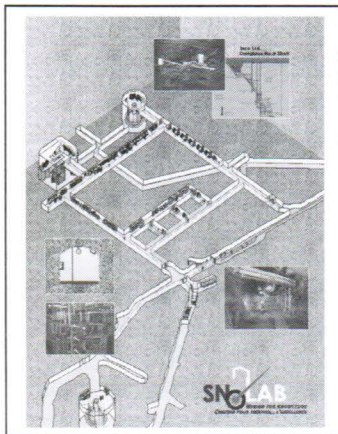
Funded in 1990, the Sudbury Neutrino Observatory is a unique facility which is measuring neutrinos from the sun in a \$ 75 million laboratory, 2000 meters underground in Inco's Creighton Mine about 25 minutes from the university. Planned and operated by scientists from 12 institutions in Canada, the United States, and the United Kingdom, SNO began its measurements in 1999, and in 2001 published major findings which showed that neutrinos oscillate from one species to another on their way from the sun. When neutrinos of all species are included, the total measured flux of solar neutrinos now agrees with the best solar theories – the *solar neutrino problem* – a large discrepancy of earlier experimental measurements at other laboratories with predictions – has been solved. Over a five year measurement period, precision measurements of this *neutrino mixing* have been made, and a small mass (actually a mass difference) is now assigned to neutrino species. The SNO experiment is now in its third phase of neutrino measurements, in which ^3He neutron counters are inserted in the heavy water core, to add to the precision of SNO's neutral current reaction measurements. See the SNO web site (www.sno.phy.queensu.ca) for lots more information.



Each year, a group of undergraduate Laurentian students are given a unique visit to the SNO laboratory.



SNOLAB – an International Laboratory for Underground Science

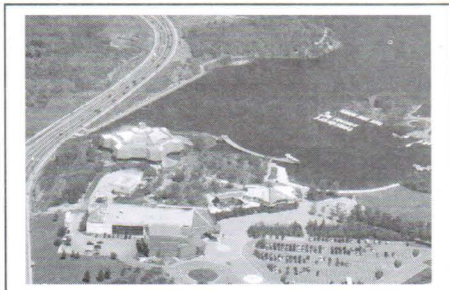


With funding from the Canada Foundation for Innovation and the Province of Ontario, SNOLAB - a \$ 50 million doubling of the size of the underground SNO laboratory - and a new surface building is now under construction. Fifteen planned experiments have already submitted letters of interest in being sited at SNOLAB, and by 2007, 4 to 5 experiments will be under

assembly. A refurbishing of the SNO detector will be a part of the laboratory development, after SNO's measurements are completed at the end of 2006. More information on SNOLab is at www.snolab.ca.

Science North

Sudbury's science centre is 20 years old this year, and still on the forefront of science interpretation and education. New exhibit development has included object theatres on SNO, on climate change and mining/geology at Dynamic Earth, as well as the production of several IMAX films and traveling exhibits. A proposed new Master's program in Science Communications at Laurentian will involve extensive further collaboration with Science North personnel and facilities.



The Sudbury Region

The Sudbury region, with a total population of 165,000 has always been noted for its large nickel & copper mining, smelting and refining activities and as a transportation and service hub. Although mine technology and automation has reduced the workforce over the past 40 years to about 25% of its earlier size, the region has diversified through the additions of government service centres, educational institutions, mining & mineral technology companies and service industries. Platinum group metal exploration and development has expanded rapidly in recent years.

Sudbury is working to become the Canadian centre of excellence in mines research and technology. More information is at www.city.greatersudbury.on.ca.

The Sudbury Basin

Sudbury's mining activities occur in about 15 nickel-copper mines in the unique and enigmatic geological structure known as the *Sudbury Basin*. The 60 km by 27 km elliptical formation shown is all that is left of a once much larger crater nearly 70 km in diameter blasted out of the Canadian Shield about 1.8 billion years ago. Most scientists who have studied Sudbury's geology believe the crater was formed by a meteorite of diameter between 1 and 3 km, travelling at 15 km/s. The impact shock energy created a huge explosion and vaporized much of the shattered country rock and the meteorite. Other rock was either melted and sprayed on to the crater walls or broken and flung far from the impact site. Between 1000 and 2000 km³ of fragments which fell back into the crater are still preserved. The Apollo 17 astronauts examined Sudbury surface rock, because of its similarity to moon crater debris. Two or three minutes after the explosion, the floor of the crater, 20 km deep originally, rebounded elastically like the peak in the centre of a bouncing raindrop, and then collapsed to form the first Sudbury Basin. The release of overburden pressure on nickel and copper-rich rock many km below the impact site caused this rock to melt and rise into the crater, then cool to form the valuable ore as well as the rugged rim around the edges of today's basin. Mountain-building stresses in the intervening years and several km of erosion as well as glacier action have distorted the crater into its present elliptical shape, reduced its size and created fertile farmland in its centre.



Please help us publicize the conference

Pass on a copy of this newsletter to your colleagues, set up transportation pools and download the conference poster/flyer at www.laurentian.ca/physics/oapt2005.

Conference Call for Papers:

All physics educators are invited to contribute a presentation at the conference. Possible ideas include: demonstrations, reports on advances in physics and related fields, or interesting information pertaining to particle physics. Interested participants please e-mail the following to **Elzbieta Muir** (emuir@sympatico.ca):

- an abstract (please include your name and school/university/institution),
- the approximate presentation length (10, 15, 20, or 30 minutes), and
- audio-visual requirements



The OAPT Photo Contest

Sponsored by A.J. Hirsch and Nelson Publishing



To coincide with the World Year of Physics, 2005, the OAPT is pleased to announce the first annual OAPT Physics Photo Contest for senior high school physics students. The contest is open to any student enrolled in a day school Grade 12 physics course in Ontario in the 2004/2005 school year. There are two categories in the contest, one for students enrolled in the university preparation course, SPH4U, and the other for students enrolled in the college preparation course, SPH4C. Physics educators at the annual OAPT Conference will judge the photos in May 2005, in Sudbury.

Grade 12 University Category Controlling Photographing Variables

Polarization of light

- polarization of reflected light
- polarization of scattered light
- polarization by double refraction
- determining stress in plastic models

Interference and/or diffraction of light

- Reflection and/or transmission in thin film interference
- using "star filters"
- using diffraction gratings with different numbers of lines per cm

Depth of field

- changing the focal length of the lens
- changing the lens aperture

Shutter speed

Film speed

Requirement: Two or three photos of the same subject with title and a double-spaced written explanation (150 to 250 words)

Grade 12 College Category

2004/2005 Theme:

The Physics of Motion, Forces, and/or Machines

for example:

- acceleration
- Newton's laws of motion
- friction
- simple machines
- domestic and industrial machines

Requirement: one or two photos with title and a double-spaced written explanation (100 to 200 words)

OAPT Members Category Controlling Photographing Variables

This is a one-time opportunity for teachers in celebration of World Year of Physics.

Subject is the same as for 4U students.

Prizes for 4U and 4C Contests

- 1st place - \$200 to the student and a Computerized Assessment Bank for 4U or 4C to the teacher
- 2nd place - \$100
- 3rd place - \$50
- An Honourable Mention will also be awarded

Special inaugural contest for teachers!

Members' Contest

Photos illustrating polarization:

- 1st place - \$200
- 2nd place - \$100
- 3rd place - \$50
- Honourable Mention

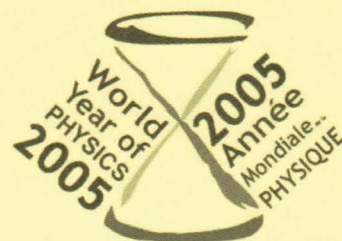
Photos illustrating all other

photographic variables:

- 1st place - \$200
- 2nd place - \$100
- 3rd place - \$50
- Honourable Mention

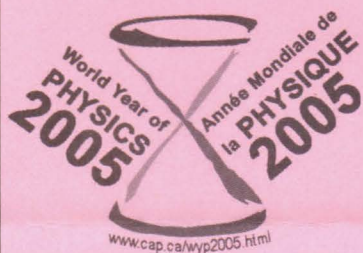
For more details on rules and submission see OAPT website at <http://www.physics.uoguelph.ca/OAPT/>

Photos must be received no later than May 2, 2005





Ontario Association of Physics Teachers



27th Annual Conference
Department of Physics & Astronomy
Laurentian University
Sudbury Ontario
May 26-28 2005

<http://www.wyp2005.org/>

- keynote speakers
- workshops
- contributed talks and demos
- tours - visits

Sudbury Neutrino Observatory
Full underground tour!
Science North
mining facilities



Welcome to the Conference. You will meet some great teachers.

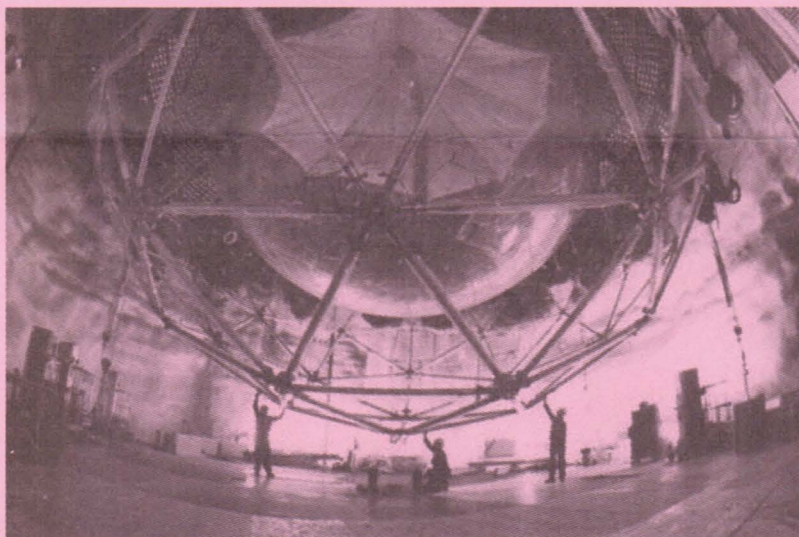


Photo courtesy of SNO

- Photo Contest
New for 2005
- Grade 11 Physics Contest
Tuesday May 3 2005



Photo Contest - Grade 11 Contest - OAPT - <http://www.physics.uoguelph.ca/OAPT/>
Conference Web Site: <http://www.laurentian.ca/physics/oapt2005>

