

International Physics Olympiad 2009

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While most travelers head to Cancun for a beach vacation amongst a sea of tourists, this year, the 40th International Physics Olympiad (IPhO) was held in **Merida, Mexico** a few hours from Cancun on the calmer Northern edge of the Yucatan peninsula. From the 11th to the 20th of July, a total of 73 countries participated in the competition while 12 countries cancelled their participation due to the swine flu scare. The organizers treated the scare seriously, measuring the skin temperature of each participant daily with an infrared thermometer and having two doctors on staff at all times. In the end, no cases were found among the participants.

The competition was important for the Mexican state of Yucatan whose governor, the honourable Ivonne Pacheco, opened it with a warm, personal speech to participants. Several other speakers from the Organizing Committee, the government, Mexican universities, the Mexican Physical Society and the IPhO organization welcomed the participants, stressed the importance of Science and Education, congratulated the students their achievement in being selected as the team members representing their countries, and wished them success in the competition. The opening ceremony also included songs by a children choir and an entertaining comedian whose physics-filled performance featured crowd interaction, lasers, and even smoke vortices projected across the stage to the delight of all present.

There were a total of three evening lectures presented to students and leaders, including one from the 1993 Nobel Prize Laureate Professor Joseph Taylor on binary pulsars astronomy.

In between the students' examinations or the preparation and administrative work of the leaders, the social program provided both rest and recreation. It featured visits to Chichen-Itza and Uxmal which are famous for their towering Mayan pyramids, giant ball game fields, and other structures of the ancient Mayan civilization. Students and leaders also visited Izama, a colonial town where three cultures coexist. In this town, thousand year-old Mayan pyramids tower over houses in quiet neighbourhoods while a bright yellow Franciscan monastery, dating back to colonial time, marks the center of town. Moreover, it is also a town where modern shops full of electronic gadgets stand side by side with traditional shops that sell hand-made hammocks. This contrast of the old and the new is also striking amongst the new Mayan generation that can be heard speaking the thousand year-old tongue of their ancestor on their brand-new cell phones.

In Merida, the accommodations for both students and leaders were of first class quality. Throughout the Olympiad, we had the occasion to taste many different dishes characteristic of Yucatan food, all excitingly different from what we would normally associate with Mexican food. We also experienced the warm Mexican hospitality wherever we traveled to. One evening, as we were strolling through Izama, we heard music coming from a house so, out of curiosity, we talked towards it. As we walked by, we saw a family in its backyard, celebrating a birthday. We smiled at them and they

waved back, inviting us to join them. Just a few moments later we were enjoying an ice-cold beverage and dancing amongst everybody, in the backyard of a quaint little house. Thinking back, I am still impressed by how easy it was to interact with them, even with our very limited Spanish.

The academic part of the competition was organized by the faculty members from the National University of Mexico, the University of Yucatan and other Mexican universities and research centers. All five problems, both theoretical and experimental, were well prepared and tested the students' original thinking and experimental abilities.

Just in time for the 40th anniversary of the first human on the Moon, the theoretical problems featured astronomical problems. The first discussed the transfer of angular momentum from the Earth to the Moon through the tides the latter induces on the former as well as, for example, the yearly increase of the Earth-Moon distance. The second problem discussed the physics of laser cooling, an important tool in the creation of Bose-Einstein condensates. The last problem showed to students how quantum mechanical effects are important to the fusion of Hydrogen into Helium that takes place at the center of stars by having them calculate both the fusion temperature and the M/R ratio of stars on the main sequence.

The experimental problems were also particularly interesting. The first had the students measure the wavelength of a HeNe laser using the diffraction from a sharp razor blade while, in the second, the students had to characterize the birefringence of a thin slab of mica using polarizers.

The marking of all problems was excellent. The marking moderations (the process of establishing the final mark acceptable by both leaders and the local marking team) were also performed in a good collegial atmosphere with very few real controversies.

Canada was represented by the following students:

Remy Abraham Mock, 11th grade, Mt. Douglas Secondary School, Victoria, BC

Jixuan Wang, 11th grade, Don Mills C. I., Toronto, ON

Shawn Xu, 11th grade, Burnaby North Secondary School, Burnaby, BCy

Michael Zhang, 11th grade, Crescent School, Toronto, ON

Jonathan Zung, 11th grade, University of Toronto Schools, Toronto, ON

The team leaders were: Dr Andrzej Kotlicki from the Department of Physics and Astronomy of the University of British Columbia and Guillaume Chabot-Couture, a former member of Canadian team at IPhO in 2000 and at present completing his Ph.D. at Stanford University.

The Canadian team performed reasonably well, winning one silver medal (Jixuan Wang), three bronze medals (Remy Mock, Shawn Xu, Jonathan Zung) and an honourable mention (Michael Zhang). A total of 41 gold medals, 70 silver medals, 79 bronze medals and 45 honorary mentions were awarded amongst the 316 participating students.

History was made at this year's Olympiad as, for the first time ever, a woman obtained the best score (48.2 out of 50) and was declared the absolute winner of the Olympiad. Handuo Shi, a young woman from China, bested her closest competitor by only 0.1%. Both students and leaders were delighted with her success and gave her a standing ovation during the closing ceremony (another first in the history of the Olympiad) as well as numerous personal congratulations from peers and leaders during the following events.

In addition to winning the competition and the prize for the best mark in the experimental competition, she was awarded the prize for best female performance. Originally designed to highlight the accomplishments of girls in a male-dominated competition (girls compose less than 5% of the participants), the success of Handuo Shi is perhaps a sign that one day this prize will become obsolete and young female physics students perform as well as their male counterpart.

Finally, acting on behalf of the organizers of the next International Physics Olympiad, the president of the Croatian Physics Society announced that the 41st International Physics Olympiad will be organized in Zagreb, Croatia from July 13th to July 21st 2010. Accompanying her announcement, she presented a movie about historic sites and natural beauty of Croatia and followed it by cordially inviting all the participating countries to attend next year's competition.