

# 38TH INTERNATIONAL PHYSICS OLYMPIAD, IRAN 2007

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Every year, thousands of young high-school level students participate in physics competitions all across the country. The extraordinary few are then invited to a national selection where they will be taught more advanced physics concepts and tested every day on different subjects both in theory and in experiments. This year, the selection was held in the beautiful Quebec City, at the Université Laval. After a week of testing, the team's five were chosen out of the best 13 in the country.

They were, in no particular order:

- Lin Fei, from Don Mills Collegiate Institute, Toronto, Ontario
- Tony Zhu, from Point Grey Secondary School, Vancouver, British Columbia
- Devanand Sukhdeo, from Champlain College, Lennoxville, Quebec
- Linda Zhang, from Western Canada Sr. High School, Calgary, Alberta
- Yifan Wang, from Laura Secord Secondary School, Toronto, Ontario

The students were accompanied by two Canadian team leaders:

- Guillaume Chabot-Couture, a former member of the Canadian team at the IPhO in 2000, now a Ph.D. student at Stanford University and
- Dr. Elham Farahani, international coordination scientist for SPARC-IPY and a research associate in the Physics department at the University of Toronto.

## SUMMARY

**It was from July 13th to July 22nd that the Canadian delegation, along with many other countries, visited Iran for the 38th International Physics Olympiad. After countless hours of preparation and long selections, five bright young physicists had been chosen to represent Canada at this international high-school-level competition. In the end, the team returned home happy and with the best performance Canada has ever had in its history of participating in the Olympiad.**

Before flying to Iran, the Canadian team met at the University of Toronto for one last training session. It was designed to show them what 5 hours of theoretical exam and 5 hours of experimental exam are like, and the five students toiled away on difficult questions usually reserved for first year university students. Past Olympiad questions on the thermodynamics of the Chinook, the electrodynamics of superconducting rings or the mechanics of a rotating and bouncing ball as well as experimental questions made to test their laboratory skills with complex problems and modern electronics were crafted to try the students once more before they faced the rigors of the upcoming competition.

There is no direct flight to Iran from Canada. To reach Tehran, the Canadian team stopped in Paris for a few hours, just enough time for some of the students to go see the Eiffel tower, a nice perk for teenagers who had never flown over the Atlantic or left North America before. After arriving in Iran, we took a bus across the desert to the heart of the country where Isfahan, the hosting city, was. Like an oasis, the city's greenery stood out next to the yellowish brick colored buildings. The river that crosses this city gives life to the entire region amidst the rigors of the desert; thus it is called Zayandeh Rood which in Farsi means "the river that gives birth".

During the competition, visits of the city's historical monuments were actually rest periods between the evaluation and the translation of the questions by the leaders or the exams for the students. Over the nine days of the competition, we had the chance to visit 1200 year-old mosques, ancient palaces and immense gardens dating as far back as the Middle Ages.

One day, we were shown an unexpected yet interesting example of coupled pendulums. In front of a mosque there are traditionally two minarets, tall and slender towers to call the followers to prayer during the day. For this particular set, it is possible to make one oscillate by swinging the other. While this must have seemed like magic for the normal crowd, amongst our group of physicists, smiles and excitement appeared immediately when the oscillation propagated from one minaret to the other.

This year, a total of 73 countries participated in the competition. Although a few countries decided not to participate, probably due to the controversial status that Iran



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Fig. 1 Team Canada all dressed up and laden with medals after the award ceremony. Back Row, Left to Right: Guillaume Chabot-Couture, Dr. Maher Abou-Guendia (Canadian embassy), Dr. Elham Farahani, Tony Zhu, Lin Fei; Front Row, Left to Right: Yifan Wang, Linda Zhang

holds in the international community, Great Britain and the United States still decided to join and brought strong teams. Stephen Hawking was even expected to talk during the Olympiad before medical reasons prevented him to travel.

The theoretical exam was composed of three questions crafted to evaluate the students on many parts of the syllabus. One studied the principle of an airbag mechanism in a car and presented problems in electricity and dynamics. Another studied the physics of binary stars and surveyed understanding in modern physics and data analysis. The last one introduced the students to dimensional analysis and the thermodynamics of black holes. Overall, the questions were clear and presented a good challenge to the best physics students in the world.

The experimental exam was composed of a single question where the contestants had to correctly use a simple spectrometer to measure the semiconducting gap of a metal oxide thin film. This problem contained challenges regarding the correct use and understanding of the apparatus as well as tested the speed of the students in performing many experimental tasks precisely and correctly.

After all the students' copies had been graded and the results moderated with the organizers, out of the 327 con-



Fig. 2 At dinner in the magnificent courtyard of the Abbasi hotel. Standing, Left to right: Mohammad Hossein Asgari (Guide), Guillaume Chabot-Couture, Mohammad Amin Sadeghi (Guide); Seated, Left to Right: Lin Fei, Devanand Sukhdeo, Linda Zhang, Tony Zhu, Yifan Wang, Somayeh Moosavi (Guide), Dr. Elham Farahani.

testants present, 37 of them received a gold medal, 46 a silver medal, 51 a bronze medal and 80 an honorable mention. The Canadian team had its best performance overall in the history of its participation in the Olympiad: Tony Zhu and Lin Fei both obtained a gold medal, Linda Zhang and Yifan Wang were awarded bronze medals and Devanand Sukhdeo received an honorable mention. With last year's participation, it was Lin Fei's second gold medal while Tony Zhu obtained the third best score, only fractions of a point behind the overall winner. This accomplishment is the second best individual performance in Canada's participation in the Olympiad!

In retrospect, the organizers did an exceptional job and ensured that the 38th International Physics Olympiad was a success. Inviting so many countries to Iran amidst all the controversy and the international politics is definitely a tour de force. It allowed five Canadian high school students to visit a country almost impossible to travel to in any other circumstances and made it possible for them to see ancient historical artifacts as well as meet countless other bright young physics students just like them from all over the world. Next year the Olympiad is in Vietnam. I have a feeling that the Olympiad will be just as memorable.