Kazakhstan hosts 2014 physics competition

Xiaoyu Xu of China earned the top score at this year's International Physics Olympiad, which was held in Astana, Kazakhstan, from 13–21 July. Some 383 high school students from 85 countries competed.

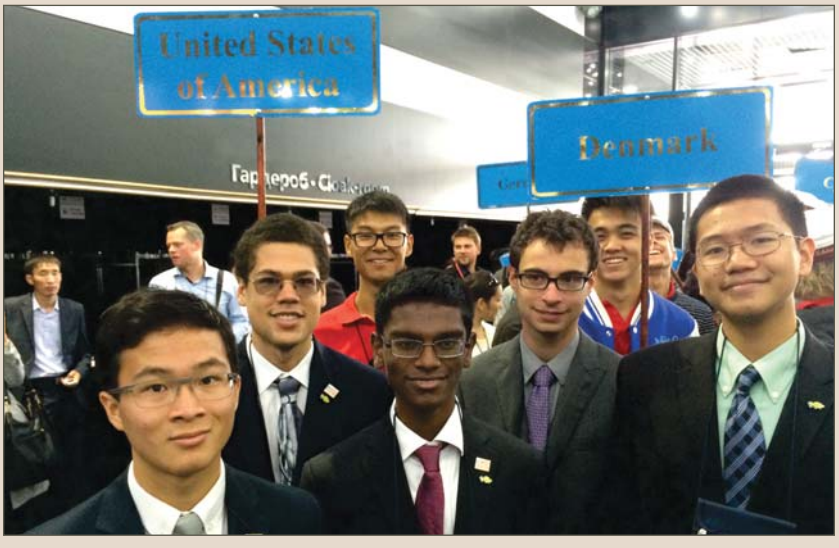
The five-member teams from China, South Korea, and Taiwan each took home all gold medals. The top scores in theory and experiment went, respectively, to Cyuan-Han Chang of Taiwan (5th place overall) and Fan Francis Wang of Singapore (9th place overall). Do Thi Bich Hue from Vietnam was the top-scoring female competitor (16th place overall). The 44 gold medalists came from 17 countries. With three golds and two silvers, all US participants earned medals—as they have every year since 1999, except for 2002 when the team did not travel to the event in Indonesia.

On the US team, Calvin Huang of Palo Alto, California, earned a gold for the second year running; he is at the far left in the top photo, which shows competitors waiting to join the opening ceremony. Also taking golds were Kevin Fei (at right in photo) of Carmel, Indiana, and Vikram Sundar (center) of San Jose, California. Alexander Bourzutschky (second from left) and Michael Winer (second from right), both of Silver Spring, Maryland, garnered silvers. The awards ceremony for the silver medal winners is shown in the bottom photo. The US team is sponsored by the American Association of Physics Teachers and the American Institute of Physics.

The experimental part of the competition involved measuring the transmission of light through liquid crystals and other birefringent materials. The theoretical problems included calculating properties of plasmas; applying the van der Waals equation to deduce bulk properties of water; and analyzing an inductor–resistor circuit, a bubble oscillating in a vacuum, and a particle sliding in a frictionless cylindrical hoop.

When they weren't sweating the exams, competitors enjoyed sightseeing, music, dancing, and tasting local delicacies such as horse meat and fermented milk from horses and camels.

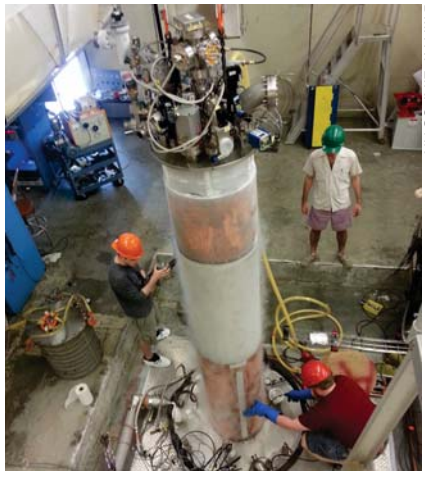
Next year's olympiad will be held in New Delhi, India. **Toni Feder**



PAUL STANLEY/US TEAM COACH

news notes

Dark-matter searches. In July the US Department of Energy and NSF gave the green light to three dark-matter experiments. LZ and SuperCDMS will look for weakly interacting massive particles (WIMPs), and the upgraded Axion Dark Matter Experiment, ADMX-Gen2, will seek a putative dark-matter particle to solve a mystery in the strong force. Funding amounts are being finalized and are subject to congressional appropriations.



DMITRY LYAPUSTIN

More mass—seven metric tons of liquid xenon—and fewer false signals will make the LZ experiment about 300 times as sensitive to traversing WIMPs as its predecessor, LUX (see PHYSICS TODAY, February 2013, page 19). The WIMP signature in LZ consists of a flash of light from a recoiling xenon nucleus followed by luminescence from drifting electrons. LZ is to be built in the Sanford Underground Research Facility for an estimated $55 million, with help from partners Portugal, Russia, and the UK, and from private sources and the host state of South Dakota.

SuperCDMS aims to determine the recoil energy imparted by WIMP collisions with supercooled solid-state germanium and silicon by looking for the phonons and the charge each event generates in the crystal detectors. The experiment is set to both grow 10-fold in size and move from the Soudan Mine in Minnesota to SNOLAB in Sudbury, Ontario, Canada, a deeper site that offers better shielding from cosmic rays. Estimated cost is $32 million, with $3 million expected from Canada and the rest from the US.

A roughly $1 million dilution refrigeration system will cool ADMX-Gen2 to a few hundred millikelvin, which will reduce thermal noise and thereby increase the sensitivity of the University of Washington–based hunt for axions. The experiment, shown in the photo, involves tuning a radio receiver to detect axions in a magnetic field as they convert to microwave photons. **TF** ■