Top STS prize for virtual-photon work

A new formula for the force between two charged particles, derived "two and a half years ago" in the space of "a couple of days," earned North Hollywood (Calif.) high school senior Ron Keeva Unz a $12,000 scholarship in the 38th annual Westinghouse Science Talent Search in Washington this week. Unz was among 40 high school scientists competing for $89,500 in college scholarships and cash awards.

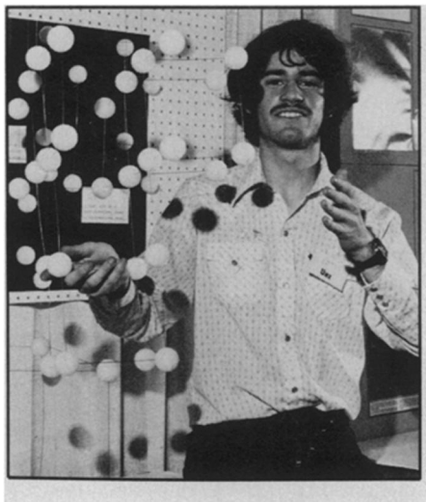
For Unz, son of a University of Kansas physics professor, the prize-winning project was more or less routine. Hearing the attraction and repulsion of charged particles described in terms of momentum transfers via "virtual" (or imaginary) photons, Unz wondered whether such virtual photons would be affected by gravitational fields in the same way that real photons are. He found that his question, which sprang from an "80- or 90-year-old theory," had never been addressed.

Unz calculated the loss of energy and momentum of virtual photons as they move against the magnetic gradients established by the particles whose interactions the virtual photons are postulated to explain. He found that "if the gravitational field of the emitting particle decreases the frequencies of the photons emitted, the electric field of the particle is decreased by the same factor." Unz says that although the new electric and potential field equations he developed to account for this are "radically different from those predicted by current theory, they are still perfectly in agreement with all current experimental evidence." Only for objects with very high mass and density—such as neutron stars — would the difference between currently held theory and his revision of it become noticeable. "Thus, if this paper's theory is correct," he says, "neutron stars should have much lower than expected electrical fields."

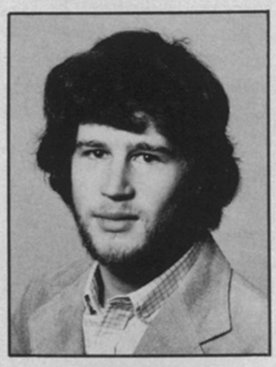
Second and third prize scholarships of $10,000 each went to 17-year-olds David Nathan Shykind of Silver Spring, Md., and Eileen Chang of Forest Hills, N.Y.

Shykind confirmed the provocative results announced several years ago in a French study on limited-specificity antibodies, according to Richard Wistar Jr., under whom Shykind worked at the Naval Medical Research Institute in Bethesda, Md. Individuals born without IgA proteins in their blood will develop allergic — and potentially lethal — reactions when transfused with blood products containing any IgA. Shykind confirmed that some "normal" people with IgA also are allergic to IgA, but only to one or two types, not the broad range that normally precipitate reactions in IgA-deficient individuals.

Chang's road to a $10,000 scholarship involved scooping mosquito eggs at 50-foot intervals along a 20-mile length of Scajaquada Creek, near Buffalo; among those collected were *Culex pipiens,* a carrier of St. Louis encephalitis. Chang raised the mosquitos to the larval stage and treated them with precocene II, a chemical which she had earlier read had controlled juvenile hormones in milkweed bugs, leading to their sterility. While her results differed from the milkweed experiments in that the mosquitos never fully matured, the result was the same, no reproduction.



Photos: Westinghouse



First place winner, Unz (above) received $12,000 scholarship. Runners-up Shykind (right) and Chang (lower right) got $10,000 scholarships.

Fourth to sixth place scholarships of $7,500 were awarded respectively to: David John LePoire, 17, of Holland, Mich., for a computer program to calculate electron densities and energies; Geoffrey Campbell Frank, 17, of Mississippi State, Miss., for study of bacteria subjected to crude oil; and Gregory Sorkin, 16, of Bellerose, N.Y., for study of graph theory.

The following each won $5,000 scholarships: Michael Urciuoli, 17, of Queens, N.Y., for a math distribution problem; Julia Elizabeth Little, 17, of St. Albans, W.Va., for a fertility-related analysis of boar sperm; Ernest Mingway Moy, 17, of Dix Hills, N.Y., for hemoglobin studies; and Ashfaq Abdulrehman Munshi, 17, of New York City, for a model of impurities in the structure of glass. The remaining 30 winners received $500 cash awards. □

Radiation panel calls for more research

The report of a federal review group on ionizing radiation, released last week, is more notable for what it didn't say than what it did say. Requested last May by President Jimmy Carter and compiled by seven federal agencies under the direction of the Department of Health, Education and Welfare, it left unanswered such timely and controversial questions as who should receive compensation for radiation-related injury, whether occupational-exposure standards should be reduced, and which federal agency should coordinate the regulation of and research on radiation. HEW Secretary Joseph A. Califano Jr., however, called the report the "most comprehensive single review ever undertaken on issues related to radiation."

Though many observers feel the draft review did not live up to expectations, it did call for:

- Conducting more research, emphasizing low-level exposures, from the population level to the cellular level.
- Setting guidelines to identify victims of radiation exposure and to determine compensation for related injury.
- Establishing a registry of radiation workers.
- Eliminating unnecessary diagnostic X-rays and reducing necessary exposures through better technician training and product standards. The report noted that the Food and Drug Administration already has begun such a program, which Califano says has reduced (in the last five years) by 60 percent the average dose received from dental and breast X-rays.
- Increasing information for the public on radiation dangers.
- Re-evaluating privacy laws to allow researchers access to records.

Another report by the review group, on coordinating future federal action on radiation, is not yet ready for publication.

More than 3,500 pages of memos and reports on the health effects of radiation during atmospheric nuclear-weapons tests between 1945 and 1962 were also made public last week by HEW. In a press conference last week Califano said that National Institutes of Health director Donald Fredrickson will convene an "outside" scientific panel to review these previously unpublished documents. Fredrickson has also been asked to oversee a

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