awarded Illinois a $500 000 grant for the machine.

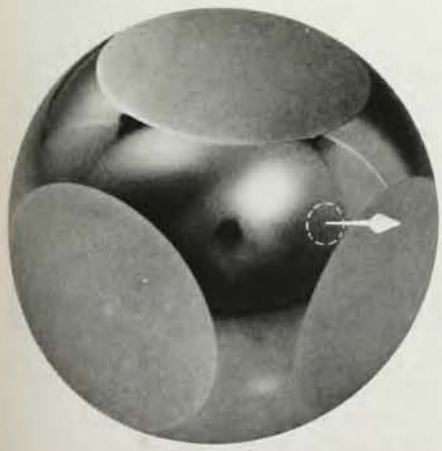
Peter Axel and Alfred O. Hanson head the project; other team members include James S. Allen, Clark S. Robinson and David C. Sutton.

The Illinois group would like to add to the linac a racetrack microtron, so that the beam would enter the linac 20 times to achieve a final energy of 600 MeV.

Six-Sided Reflecting Satellite Could Check General Relativity

Duane H. Cooper and Howard W. Knoebel (University of Illinois) have studied a low-cost orbiting-gyro experiment that they expect could distinguish between the predictions of general relativity and Brans-Dicke theory (PHYSICS TODAY, January 1967, page 55).

The satellite would be a spinning dielectric sphere, 60-cm across, with six optical flats symmetrically arranged on the surface (reflectively coated). Then existing satellite-observing stations would simultaneously photograph the stellar background and flashes of sunlight reflected from the optical flats to measure reflected rays. Thus the experiment determines spin-axis orientations. By using a dielectric body at an orbital altitude of 1000 km, Cooper and Knoebel expect to eliminate both magnetic and atmospheric disturbances. Recently, by simulating the experiment on a computer they concluded that remaining disturbances can be eliminated by data-reduction procedures.



GENERAL-RELATIVITY SATELLITE. Ground stations would simultaneously photograph stellar background and sunlight reflected from the six optical flats to find change in spin-axis (arrow) orientation over one to two years. Experiment could check Brans-Dicke theory.

By running the experiment for one to two years, Cooper and Knoebel expect they could measure the relativistic precession to better than 1%, sufficient to observe the 8% discrepancy between the predictions of general relativity and Brans-Dicke theory.

Another orbiting-gyro experiment, which uses a superconducting rotor, (PHYSICS TODAY, January 1968, page 103) is being prepared by C. W. F. Everitt and William M. Fairbank of Stanford.

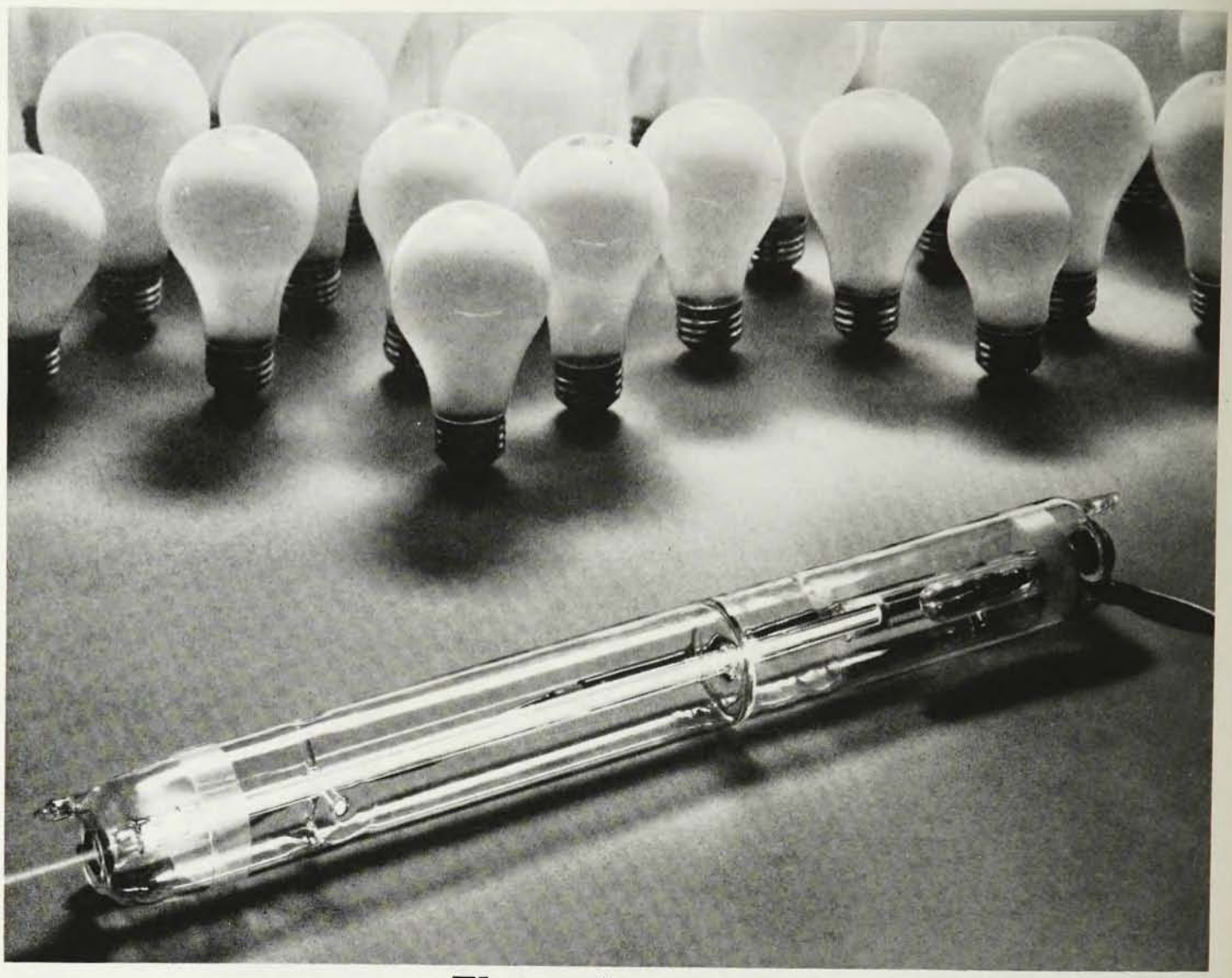
Dubna and LRL Compress Smokatron Electron Rings

Enthusiasm for the electron ring accelerator ("smokatron") is growing. In a special session at the International Atomic Energy Agency conference on plasmas and controlled nuclear fusion (held in Novosibirsk the first week in August) physicists from Dubna and Lawrence Radiation Laboratory compared notes.

In an electron ring accelerator (PHYSICS TODAY, February 1968, page 51), the plan is to inject electrons into an axially symmetric magnetic field, at right angles to the field. Electrons move in a circular orbit in a plane perpendicular to the field. The magnetic field is increased, causing the ring to shrink and the electron energy to increase. Then hydrogen gas is injected, becomes ionized, and the protons become trapped inside the ring of circulating electrons. After shrinking one can accelerate the ring by a variety of methods.

V. P. Sarantsev reported that his Dubna group had successfully trapped and shrunk a ring with a maximum current of 2000 amperes. A 200-A beam of 1.5-MeV electrons is injected and forms a doughnut 40 cm in radius. After compression the major radius is 5 cm and the minor radius is 0.15–0.20 cm. The ring lasts about 50 microseconds and then grows because the magnetic field is decreased. Eventually they expect to build a 2000-A electron injector.

The Dubna experimenters have not succeeded in accelerating a ring yet. Work has been slowed because the injector was not working for several months. To accelerate the ring, they are building a system for expanding the ring in a decreasing magnetic field.



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Nicholas Christofilos and Chester Van Atta of Lawrence Radiation Laboratory, Livermore, told of smokatron experiments scheduled to start on 1 Sept. At mid-September we learned that the LRL group had started experiments aimed at trapping and compressing electron rings.

Next month modifications of the electron injector, which is part of the Astron controlled-fusion experiment, are scheduled to be finished. Energy will be increased from 3.7 to 4.2 MeV and current from 400 to 800–1000 A.

Comparing other methods of accelerating the ring, Sarantsev noted that resonant cavities would cost about $100/joule, whereas the Berkeley proposal, to use a system of successive traveling pulses, would cost considerably less.

Princetonians Fail to Find Faster-than-Light Particles

Two Princeton experimenters have looked for particles that move with velocities always greater than the speed of light in a vacuum ("tachyons") and failed to find them. (Results are reported in *Phys. Rev.* **171**, 1357, 1968).

In 1962 Olexa-Myron Bilaniuk, V. K. Deshpande and E. C. George Sudarshan (*Amer. Jour. Phys.* **30**, 718, 1962) argued that faster-than-light particles could be accommodated by Einstein's special theory, and Gerald Feinberg more recently (*Phys. Rev.* **159**, 1089, 1967) found that relativistic quantum theory also can include such particles.

If one assumes that tachyons interact with ordinary particles and fields, one might spot them by the Cerenkov radiation they emit in a vacuum. Torsten Alväger and Michael N. Kreisler surrounded a gamma source with a lead shield and looked for charged tachyon pairs that would be formed in the shield. They applied an electrostatic field across two parallel plates in a vacuum of 10^{-6} torr and looked at the region between the plates with a photomultiplier.

The experimenters place an upper limit on charged tachyon production in lead of less than 3 microbarns for photon energies of 0.8 MeV.

Alväger, now at Indiana State University has begun a search for neutral tachyons, and Kreisler is trying to improve his experiment. □