one-dimensional electronic dielectric response function, that is, to keep it large but not divergent. One way of carrying out this smoothing is to add to the thermal disorder some static, random potentials in the solid by altering the molecular structure and mixing into the lattice weak, random dipoles.

- One wants to hinder the Peierls dimerization, the pairwise interaction in which the uniformly spaced chain of molecules collapses so that one has instead a chain of pairs. To prevent that, one can imagine putting "sticks" between the sites, some bulk that does not allow the molecules to come close together. In this steric-hindrance approach one attaches inert groups onto the molecular sites to keep them from collapsing towards one another.
- The electronic dielectric response function can be smoothed by adding some two-dimensional character to the otherwise one-dimensional chains so that an electron can occasionally go off to the left or right down another chain. Although the system would continue to be strongly one-dimensional, weak two-dimensional coupling should be possible.

In their earlier work the Penn group had decided that to maintain the metallic state in the material they were working on, (NMP)(TCNQ), they would need to replace the NMP cation by a small polarizable molecule. Which one to select became clear through the work of F. Wudl (State University of New York at Buffalo) and his collaborators, who pointed out that the TTF molecule existed and had certain advantages. The TTF cation, which contains sulfur, is not only small and polarizable but also has the possibility of forming metallic chains in the solid.

As a first attempt at stabilizing the superconducting state the Penn group decided to put an asymmetry into the TTF molecule, leading to the new compound (ATTF)(TCNQ). They find that the results on (ATTF)(TCNQ) are reproducible with T_c decreased somewhat, qualitatively as expected.

Although they worked for three months, the Penn group has not yet been able to make single crystals of (ATTF)(TCNQ) big enough for four-probe conductivity measurements. Instead, they developed a new technique for obtaining information on the bulk conductivity properties from compactions of samples. In the measurements on (ATTF)(TCNQ) powder or crystals, Garito told us, a large conductivity maximum is reproducibly observed with indications of $(T - T_c)^{-3/2}$ behavior, but the measurement is limited by the silver paint used in the voltage-shorted compaction device employed. The Penn group feels that the asymmetrized TTF cation has solved the reproducibility problem. They recognize that single-crystal data are clearly needed and are continuing to try to obtain them.

What will the future hold? Heeger feels that if the group's prescriptions are followed, one should be able to stabilize organic high-temperature superconductors. "As high as room temperature?" we asked. "Although room temperature seems unlikely, no one knows really. In the absence of a suitable microscopic description of what's going on, one cannot predict what the limits are. However one thing is clear. We observe superconductive behavior at high temperatures in the form of fluctuations. Now what is needed is hard work, both chemical synthesis and physical measurements, aimed toward stabilizing the organic superconductor." —GBL

Kitt Peak opens up its 158-inch telescope

The ceremony known as "letting in the first light" was recently held for the new 158-inch telescope at Kitt Peak National Observatory. The telescope, which will be the second largest optical telescope in the world when it is dedicated in June, is named the Mayall telescope in honor of Nicholas U. Mayall, director of KPNO for eleven years. The new instrument is expected to be in full operation in October.

The Mayall telescope will have a wider field of view than any other large reflecting telescope—six times wider than that of the 200-inch Hale telescope. One photograph taken through the telescope will give astronomers at least 40 times more sky coverage than the largest presently available and will cover an area about twice the size of the moon. Electronic image detectors will be used extensively on the telescope, which will be used for observation of faint quasars and pulsars as well as radio and x-ray sources that radiate in the visible range.

The telescope itself weighs 375 tons and is perched on a hollow cylindrical pier 37 feet wide and 92 feet high. This is a higher pier than is normally used; it was needed to get the instrument above the atmospheric turbulence caused by rising hot-air currents at the site. A circular building 105 feet in diameter and 185 feet high houses the instrument. It has a 105-foot diameter dome that weighs 500 tons and can rotate 360 deg on 32 trucks that travel on a circular rail.

The 15-ton primary mirror is made of fused quartz, which has a low coefficient of thermal expansion, and is set in a horseshoe-shaped yoke that has an outer bearing surface 41 feet in diameter.

The telescope has a "flip secondary" —a ring that supports a camera on one side and a secondary mirror on the other. This ring is located at the prime focus and permits the telescope to be switched rapidly from operation at the prime focus to Cassegrain or coudé focus operation. This feature is rarely found in large telescopes.

The total cost of building the telescope was $10 million, supplied by the National Science Foundation. It is operated by the Association of Universities for Research in Astronomy, which is responsible for operating KPNO under contract with NSF. Observing time will be open to scientists throughout the country, regardless of affiliation.

Another telescope, which is nearly a twin to the Mayall instrument, is being built at the Cerro Tololo Inter-American Observatory in Chile. This instrument is expected to be operating in 1975 and will be one of the major instruments for studying the southern sky. Another telescope, with a 236-inch mirror, is being constructed by the Soviet Union near Zelinchuk on the northern slopes of the Caucasus Mountains. When completed it will be the largest telescope in the world, relegating the Mayall size of 158 inches to third largest.

Total cross sections

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a more controlled cosmic-ray experiment studying proton–nucleus cross sections at 10^5 GeV.

In an attempt to calibrate the excitement in the high-energy physics community, Yang compared the ISR results with parity violation in 1957 and *CP* violation in 1964. Although he feels that probably the new result is as yet less exciting, it could lead to insight that may prove eventually no less important.

As Victor Weisskopf (MIT) points out, the expectation that all results become constant at a high enough energy has again been thwarted, and such a region in fact may never be reached.

Experiments. In one of the two experiments done at the ISR, reported[3] by a collaboration between Sezione di Pisa of INFN, the Istituto di Fisica of the University of Pisa, the Scuola Normale Superiore and the State University of New York at Stony Brook, the experimenters determined the total cross section from the measured interaction rate and the machine luminosity, which represents the overlap of the two beam fluxes in the intersection region. To measure the luminosity the Pisa–Stony Brook collaboration uses the so-called "van der Meer method," which consists in displacing the beams vertically with