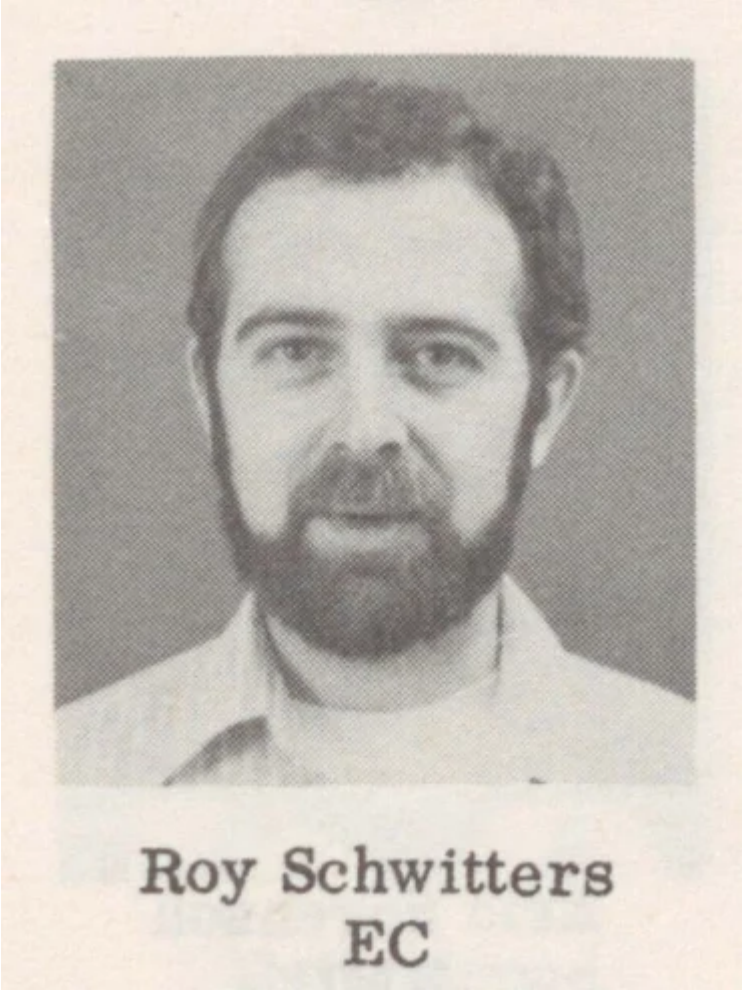
In memory of Roy Schwitters

March 1, 2023



Roy Schwitters's 1975 staff photo.

Roy Schwitters, a prominent physicist who worked at SLAC in the 1970s as an experimental research associate and assistant professor, went on to direct the Superconducting Super Collider project and spent 30 years on the faculty of the University of Texas, died earlier this month at the age of 78.

Roy began his career helping to develop particle detectors. While at SLAC, he was involved in the early research that led to the discovery of the psi particle, which was independently discovered and dubbed the J particle by a team of scientists from MIT. The discovery of what came to be known as J/psi proved the existence of the charm quark and led to a Nobel Prize in physics for SLAC's Burton Richter and MIT's Samuel Ting.

SLAC's Marty Breidenbach shared some memories of Roy's work at SLAC and role in discovering J/psi, which launched what's known as the November Revolution in physics:

Roy came to SLAC as a research associate in 1971 after earning a PhD from MIT based on research he had performed here. He became an assistant professor in 1974 and an associate professor in 1979, and left for a faculty position at Harvard that same year. Among the researchers he advised while at SLAC were Rafe Schindler, Tom Himel and Jim Siegrist.

Roy led the detector tracker team for the Mark 1 Detector, which captured the results of particle interactions produced by the SPEAR collider. Mark 1 was a revolutionary type of detector that could measure particles leaving the interaction point in almost every direction. It incorporated a number of sub-detectors, each designed to capture a different type of collision product, all wrapped in cylinders around the interaction point to cover as large an area as possible. Today's particle collider detectors are all designed this way. Mark 1 would become a crucial instrument in the discovery of the psi particle and its excited states.

In 1971, Roy was leading the effort to publish a paper based on a set of measurements of charged particles being produced in the detector's electron-positron interactions, and inconsistencies in some of the measurements bothered him. He led an effort with SLAC's Vera Luth and Martin Breidenbach to find out what went wrong. They initially thought it would be a software problem, and they searched for it by hand scanning many particle events on SLAC's first computer displays, among other things. Eventually, the software was exonerated, but the team still expected that the explanation for the inconsistencies would be mundane. That led to an intense lobbying campaign to convince Burton Richter to run SPEAR 2 at a relatively low energy to straighten things out.

Burt had led the effort to transform SPEAR 1 into SPEAR 2 – a much higher energy machine – and was reluctant to run at such a low energy, but he finally agreed to do it. After a difficult start on a Friday, an extremely narrow resonance, responsible for the inconsistent data, was discovered the next day. Far from being mundane, it was the signature of the psi particle.

On Sunday, the resonance was rescanned and a draft paper for Physical Review Letters was started. On November 11, 1974, the group announced the discovery of psi. Roy, Vera and Marty were in the Group C conference room working on the paper when Roy, who was the experiment spokesperson, was summoned to Director Pief Panofsky's office. He returned about an hour later, white as a sheet, to announce, "Sam has the same thing!" Later that day, Roy and Sam gave talks on these independent discoveries in the SLAC auditorium to a standing-room-only audience.

In 1975, Roy was the lead author on a paper discovering jets in electron-positron annihilation, and SLAC's Gail Hanson led related work that also discovered jets with a different technique on SPEAR 2. In 1996, Roy and Gail shared the Panofsky Prize for the jet discovery research.

You can view Roy's biographical information on SLAC's Archives, History & Records Office website.

The following obituary was published in the Austin American Statesman:

Nationally prominent physicist Roy F. Schwitters — laboratory director for the ambitious yet incomplete Superconducting Super Collider project in North Central Texas during the 1980s and '90s — died Jan. 10 of cancer on Orcas Island, Washington. He was 78.

"Schwitters was a dynamic leader in the field of experimental high-energy physics," said William Coker, a physics professor at the University of Texas, "and therefore the natural choice to become director of the Texas Superconducting Super Collider project. Later, as a faculty member at the University of Texas, he remained a force to be reckoned with, but his leadership style was deceptively 'laid back.'"

The Texas SSC, a ring-like tunnel 54 miles in circumference near Waxahachie, was intended to explore the edges of knowledge about energy and matter. It would have been the world's largest and most energetic particle accelerator. Predicting an economic bonanza from this experimental project with national security significance, the state of Texas contributed $400 million, and the federal government allocated at least $1.6 billion to design and build it. It was canceled in 1993.

A principal discoverer of the 'charm quark'

Born in Seattle in 1944, Schwitters earned degrees from the Massachusetts Institute of Technology. He taught at Harvard University, Stanford University and the University of Texas.

"Roy grew up in Seattle, and one of his early memories is of seeing the inaugural flight of the Boeing B-52 fly past his school, which awakened his interest in science and technology," wrote his friend, author and journalist Lawrence Wright, on Schwitters' death. "His own first ride in an airplane had to wait until he left to study physics at M.I.T."

At that university, he joined the circle of charismatic Harold “Doc” Edgerton, who applied physics to sonar and deep-sea photography, pioneered ultra-high-speed photography, and invented the hydrogen bomb detonation device.

Early in his career, Schwitters helped develop particle colliders, including those at the Stanford Linear Accelerator Center. Using the Stanford Positron Electron Accelerating Ring, he was one of the principal discoverers of the "charm quark" in 1974.

"An iconic picture of the detector features Roy in the middle of it," said Karol Lang, a physics professor at UT. "His next mark on the field was the leadership of the (Collider Detector) experiment at Fermilab, where he showed his managerial skills, which were fortified by deep technical knowledge and intuition."

Schwitters, therefore, was a natural to lead the gigantic Texas SSC project. In 1993, Congress cut the program in a budget-saving move, in part because America's intense national security rivalry with Russia

had ended with the close of the Cold War.

In fact, with no guarantees of what might be discovered, the project had always been a hard sell to those skeptical of the value of pure science.

Schwitters famously called the funding cut "the revenge of the C students."

Among scientists, in Austin and beyond

"Bitterness was not a part of Roy's personality," Wright wrote. "He was kind and jovial and he adored teaching."

He became a regular faculty member of the physics department at UT in 1990. While pursuing research, he served on the UT faculty for 30 years before his retirement in 2020.

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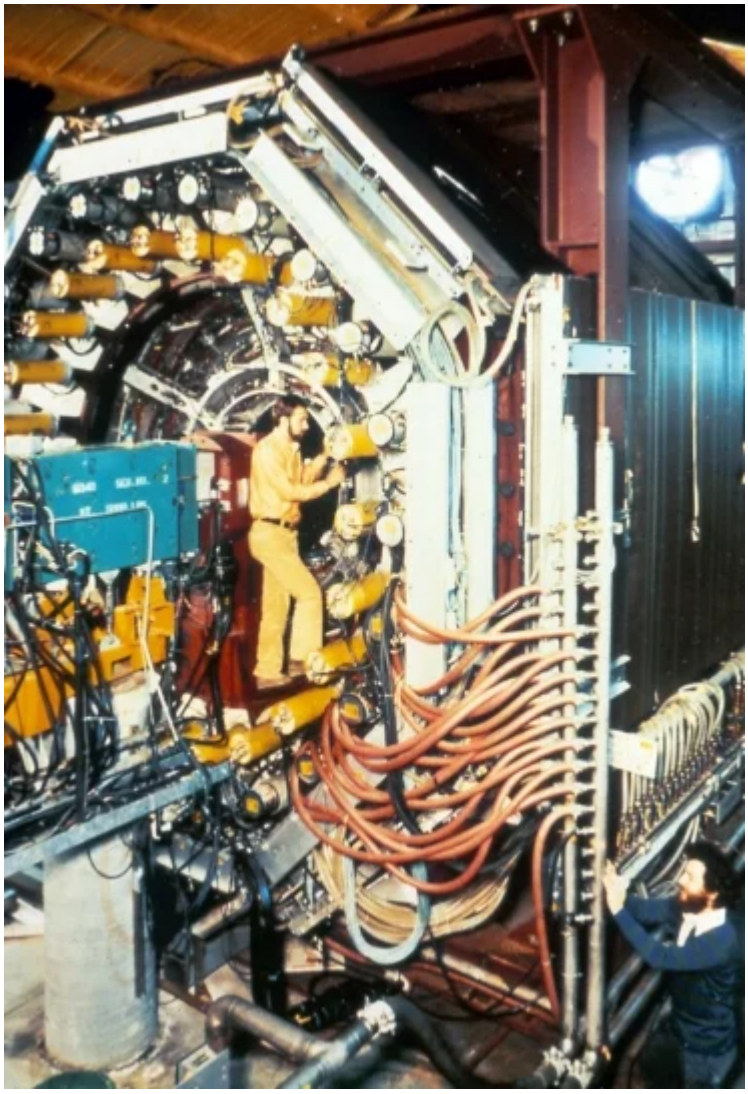

The Mark I Detector with Roy Schwitters standing near its axis. (Photo courtesy of The Regents of the University of California, Lawrence Berkeley National Laboratory)

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