

## Nina Byers FREE

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## Nina Byers

Nina Byers, a professor emeritus at UCLA, died on 5 June 2014 at her home in Santa Monica, California. Although she was primarily a particle theorist, her most important work may well be her contribution to our understanding of superconductivity. She was a trailblazer for women in physics and, in her retirement, led the effort to chronicle the contributions of women to physics in the 20th century.

Nina was born in Los Angeles on 19 January 1930. She graduated from the University of California, Berkeley, in 1950 with a BA in physics. There she met Enrico Fermi, who was visiting the department and teaching a quantum mechanics course. Fermi encouraged her to attend the University of Chicago for graduate school. She pursued theoretical work there and was Murray Gell-Mann's first and last Chicago student, before he moved to Caltech. Nina completed her PhD under Gregor Wentzel in 1956 on the interactions of low-energy pions with nuclei.

After completing her PhD, Nina joined Rudolf Peierls's group as a post-doctoral researcher at the University of Birmingham. She and Peierls investigated an idea recently put forth by Julian Schwinger that the weak interactions were mediated by massive charged bosons. They were able to show that the Fermi theory of beta decay is indeed well described by charged vector-boson exchange, provided the boson is very massive. That period in Birmingham marked the start of a wonderful friendship between Nina and Peierls, which would lead her to accept a joint appointment at Oxford when Peierls moved his group there in 1963.

In 1958 Nina moved to Stanford University, where she continued working on the weak interaction. With Fredrik Zachariasen, she showed that if electron and muon neutrinos were not distinct species, then  $W$  exchange would produce a rather large contribution to the muon anomalous dipole moment.

Nina's interest in superconductivity was spurred by C. N. Yang's visit to Stanford in the spring of 1961. Bascom Deaver and William Fairbank had shown that the magnetic flux in superconductors was quantized in units of



Nina Byers

DON LIEBIG, UCLA PHOTOGRAPHY, COURTESY AIP ESVA

$hc/2e$ , rather than  $hc/e$ , as proposed in the theory put forward by Fritz London. In a paper later that year, Nina and Yang masterfully showed that the formation of Cooper pairs in the superconductor quantizes the flux in units of  $hc/2e$  and that, therefore, Deaver and Fairbank had provided an "experimental proof" of the Bardeen-Cooper-Schrieffer theory of superconductivity based on electron pairing.

Family considerations brought Nina back to Los Angeles in the fall of 1961, where she became an assistant professor at UCLA. She was the first and only female professor in the department for the next 20 years. Nina concentrated on the problem of determining the spin parity of resonance states via the angular distribution of their decay products. Her CERN report on the topic, written when she was there on a Guggenheim Fellowship in 1965, was of considerable importance to experimentalists, even though it was never submitted for publication.

Nina's work in particle physics ranged from droplet models of diffractive scattering in the 1960s, to calculations of radiative corrections in the 1970s, to detailed calculations of the quarkonium potential for heavy quark systems in the 1980s. Throughout, her work was characterized by keen physical insight and an understanding and appreciation of experimental results.

Nina's retirement from UCLA in

1993 was a beginning rather than an end. She remained committed to the affairs of the American Physical Society, particularly of the Panel on Public Affairs, the Forum on Physics and Society, and the Forum on the History of Physics. As a devoted antiwar activist, she was interested in the history surrounding the making of the atomic bomb. She focused her exploration on the estrangement of Fermi and Leo Szilard. That work returned her to her roots at the University of Chicago and reminded her of the weekly dinners she would have with Szilard, during which she reported on Fermi's pion work.

Nina also researched how Emmy Noether discovered the fundamental theorem relating symmetries of nature to conservation laws when her main work was in the foundations of abstract algebra. Nina's great accomplishment in her retirement was documenting the contributions of women like Noether and herself to modern physics. She was the driving force behind the Web archive "Contributions of 20th Century Women to Physics" (<http://cwp.library.ucla.edu>) and the resulting book *Out of the Shadows: Contributions of Twentieth-Century Women to Physics* (Cambridge University Press, 2006).

Nina's passion for learning and her activism extended beyond physics. She was a lover of classical music, film, and theater and an activist for social justice and environmental causes. She was always the person who would ask, "What can we do about this?" The last project she had embarked on grew out of her concern that eminent scientists no longer make extended visits to other institutions. As a result, students no longer are having opportunities like her participation in Fermi's quantum mechanics course at Berkeley. Nina worked to create a prize lectureship that would bring eminent physicists to UCLA, so that students could have the kind of experience that was so influential to her career. The Nina Byers Lectureship will be an excellent way to honor her remarkable life.

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