David G. Hitlin
Professor of Physics
California Institute of Technology

Born

April 15, 1942 Brooklyn, NY

Education

B.A.	Columbia University	1963
M.A.	Columbia University	1965
Ph.D.	Columbia University	1968

Academic Positions

Instructor	Columbia University	1967-1969
Research Associate	Stanford Linear Accelerator Center	1969-1972
Assistant Professor	Stanford University	1972-1975
Assistant Professor	Stanford Linear Accelerator Center	1975-1979
Associate Professor	California Institute of Technology	1979-1985
Professor of Physics	California Institute of Technology	1986-present

Biographical Sketch

David Hitlin received his B.A. (1963), M.A. (1965) and Ph.D. (1968) degrees from Columbia University. He was an Instructor at Columbia from 1967 through 1969. His thesis, with C.S. Wu, was on the determination of shapes and sizes of deformed nuclei using high resolution spectroscopy techniques with muonic X-rays. This work was made possible by the development of Ge(Li) solid state photon detectors, which improved the achievable energy resolution for photons in the 1 to 10 MeV energy range by nearly two orders of magnitude. With this new-found ability to resolve fine and hyperfine structure in muonic atoms, a wide ranging series of investigations of separated isotopes from calcium to uranium was undertaken. Isotope shifts and isomer shifts were measured, allowing the determination of detailed nuclear charge distributions for spherical nuclei, and the measurement for the first time of the spatial distribution of M1 and E2 moments in deformed nuclei.

Although trained in experimental nuclear physics, he switched to elementary particle physics, moving to the Stanford Linear Accelerator Center as a Research Associate, where he worked in the Mel Schwartz/Stanley Wojcicki group. He was appointed Assistant Professor of Physics at Stanford in 1972. He participated in the construction of a K_L^0 spectrometer for high precision studies of the weak decays and interactions of K_L^0 mesons. The first experiment was a measurement of the charge asymmetry in $K_{\mu 3}$ decays to determine the *CP* violation parameter Reε. With this large $K_{\mu 3}$ sample in hand, he was able to measure the vector and scalar semileptonic decay form factors, solving a longstanding problem by finding agreement with

the predictions of current algebra, which had appeared to be in doubt from the results of lower statistics experiments. This was followed a high statistics study of the Dalitz plot of the decay $K_L^0 \to \pi^+\pi^-\pi^0$, and the first measurement of the branching ratio and photon energy spectrum in $K_L^0 \to \pi^+\pi^-\gamma$ decay. He then became co-Spokesman, with Robert Morse of E92, which used the K_L^0 spectrometer to trigger a rapid cycling bubble chamber to study $K_L^0 p$ interactions.

In 1975 he returned to SLAC as an Assistant Professor, joining the Richter group and becoming involved in e^+e^- annihilation studies at the SPEAR storage ring, at first with the Mark II detector, where he led the construction of the liquid argon electromagnetic calorimeter and was co-Spokesman with Gary Feldman of the first series of experiments. Rather than move with the Mark II detector to PEP, in 1978 he conceived the Mark III experiment, for which he was founding Spokesman. The Mark III, optimized for exclusive state reconstruction, carried out a long and productive program of detailed studies of weak decays of charmed mesons and hadronic systems produced in J/ψ and ψ' decays, highlighted by the measurement of absolute D^0 and D^+ branching fractions, the first precise determination of the ration of D^0 to D^+ lifetimes via the measurement of the D^0 and D^+ inclusive semileptonic branching ratios.

He moved to Caltech in 1979 as an Associate Professor. He was appointed Professor of Physics in 1986. At Caltech, he continued his work with Mark III throughout the eighties. He was a co-founder of the SLD experiment at the SLAC Linear Collider, which made precision measurements at the Z^0 resonance and was System Manager for the liquid argon electromagnetic and hadronic calorimeter. When SPEAR was given over entirely to synchrotron radiation studies, he continued his exploration of J/ψ, charm and τ physics with the BES collaboration in Beijing, which produced the highest precision measurement of the mass of the τ lepton, thereby resolving an apparent discrepancy with the Standard Model.

Hitlin was instrumental in the approval of the PEP-II asymmetric e^+e^- storage ring at SLAC, and was for six years founding Spokesman of the *BABAR* experiment at PEP-II, which established the existence of *CP*-violating asymmetries in B^0 meson decays. These studies provided the first confirmation that the *CP*-violating Cabibbo-Kobayashi-Maskawa phase of the six quark Standard Model provides an explanation for experimentally measured *CP* asymmetries. This work was cited in the award of the 2008 Nobel Prize in Physics to Kobayashi, Maskawa and Nambu. In recognition of the role played by the *BABAR* results, he and Jonathan Dorfan were invited to attend the festivities in Stockholm. *BABAR* has gone on to publish nearly 500 papers in refereed journals, providing not only a massive foundation for the flavor sector of the Standard Model, but a series of strong constraints on New Physics scenarios.

Hitlin conceived the idea of a Super *B* Factory, an asymmetric e+e- collider with two orders of magnitude higher luminosity than the current generation machines, in 2001. Attempts to upgrade PEP-II and *BABAR* at SLAC to a Super *B* factory proved unsuccessful, as did the effort to build Super*B*, a Super *B* Factory and associated experiment. which were to be built on the campus of the second Rome University at Tor Vergata, Italy. After initial approval by the Italian government, Super*B* was cancelled at the end of 2012. Super*B* was intended to search for the effects of physics beyond the Standard Model by studying subtle effects in *CP*-violating

asymmetries in the decays of *B* and *D* mesons, and in very rare heavy quark and tau lepton decays, particularly those that could provide evidence of charged lepton flavor violation.

In 2010, Hitlin joined the Mu2e experiment at Fermilab. Mu2e will search for the conversion of muons into electrons in the field of an aluminum nucleus, which would be evidence for charged lepton flavor violation, at a sensitivity somewhat greater than that of Super*B*.

Hitlin was Principal Investigator of the Caltech High Energy Physics grant from1994 to 2010. He is a Fellow of the American Physical Society. He has served on the Program Advisory Committees of the SLAC, Fermilab, Cornell and Brookhaven laboratories, on the Argonne National Laboratory Advisory Panel for High Energy Physics, on the DOE Technical Advisory Panel on the University Program and on the Fastbus Standards Committee, as well as on numerous other advisory groups. He was Chairman of SLUO, the SLAC Users Organization, for three terms. He has served on the High Energy Physics Advisory Panel to the DOE and NSF, and was for eight years a member of the Fermilab Board of Overseers, and its successor, the Fermi Research Alliance Board of Trustees.

He is the recipient (with Jonathan Dorfan, Stephen Olsen and Fumihiko Takasaki) of the 2016 American Physical Society's W.K.H. Panofsky Prize in Experimental Particle Physics, with the citation *"For leadership in the BABAR and Belle experiments, which established the violation of CP symmetry in B meson decay, and furthered our understanding of quark mixing and quantum chromodynamics."*