physicstoday

**Stirling Auchincloss Colgate**

**Hui Li**[1] and **J. Craig Wheeler**[2]
September 2014

ISSN: 0031-9228, Online ISSN: 1945-0699
DOI: http://dx.doi.org/10.1063/PT.3.2523
Volume 67, Issue 9, pages 54- 54

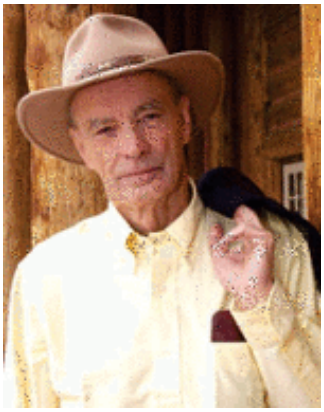
# Stirling Auchincloss Colgate

Hui Li 1; J. Craig Wheeler 2

**1:** Los Alamos National Laboratory, Los Alamos, New Mexico; **2:** University of Texas at Austin

Keywords

Physicist, astrophysicist, experimentalist, and theorist **Stirling Auchincloss Colgate** died at home in White Rock, New Mexico, on 1 December 2013 after a prolonged illness. He had a zest for life and a drive to understand that could not be contained in a single subject or career.



Stirling Auchincloss Colgate

LOS ALAMOS NATIONAL LABORATORY

Stirling was born in New York City on 14 November 1925. As a young man, he attended the Los Alamos Ranch School. He was familiar enough with nuclear physics in 1942 that when a stranger in a fedora showed up to shut down the school, he recognized J. Robert Oppenheimer and deduced that the goal was to build an atomic bomb. Stirling went to Cornell University for a year and then joined the US Merchant Marine in 1944. He amazed his superiors by single-handedly fixing a large electric motor and explaining what happened in Hiroshima.

In 1946 Stirling returned to Cornell, where he earned his BS in 1948 and a PhD in nuclear physics in 1952 under Robert R. Wilson. As a postdoc at the University of California, Berkeley, he was among the first scientists at the birth of Lawrence Livermore National Laboratory (LLNL). He designed and led the neutron and gamma-ray diagnostics for the March 1954 Castle Bravo hydrogen bomb test, the first to use the compact lithium deuteride technology. He was 29. Contemplating shock breakout from the device also led him to ponder shock breakout in supernovae. In 1959 Stirling served as a senior scientific adviser to the State Department in the Geneva negotiations on a nuclear test ban treaty. He argued that satellite detectors might mistake supernova emission as a weapon test. A Soviet delegate brushed him off with the question, “Who knows what a supernova looks like?” Stirling took that as a challenge.

Beginning with papers on supernova shock breakout, Stirling became a leading contributor to astrophysics. His groundbreaking work in 1966 on the neutrino deposition model of core- collapse supernovae remains the basis of the theory today; the essence of the theory was verified two decades later by the discovery of the neutrinos from SN 1987A. He contributed substantially to our understanding of how radioactive decay powers supernova light curves. While president of the New Mexico Institute of Mining and Technology from 1965 through 1974, he foresaw the era of mass automated detection of supernovae before large detectors and fast computers made it possible. He called the technology “dig-as,” for digitized astronomy, a colorful name that did not catch on.

From 1976 until his death, Stirling was a senior fellow in the theoretical division at Los Alamos National Laboratory (LANL). He had a keen interest in magnetic fields dating back to his days at LLNL, where he led laser fusion and magnetic fusion programs. He was fascinated by the origins of cosmic magnetic fields, cosmic rays, and black holes, and he was a strong proponent of the “magnetic universe.” He argued that a significant fraction of the energy liberated by the formation of black holes at the centers of galaxies is converted by dynamos into magnetic fields, which are then transported to intergalactic space by jets and radio lobes. To the end of his life, he worked at New Mexico Tech on an experiment to demonstrate a magnetic dynamo in rotating cylinders of liquid sodium.

Stirling developed techniques of stress engineering to support mine shafts and theories about vision

and the origin of human intelligence. He recognized the danger of HIV before the topic was widely discussed publicly, and he called for understanding its biology as the only practical solution. Attempting to understand Oklahoma tornadoes, he flew his private plane and fired instrumented rockets through them. He recognized the dangers of stoichiometric mixing of the liquefied natural gas in a fully loaded tanker and claimed to have saved Heimaey, an island off Iceland, from the threat of a proposed diversion of lava to the sea, where dynamic self-mixing could have released the thermal energy of a thermonuclear bomb.

Associated with the Aspen Center for Physics from its earliest days, Stirling promoted astrophysics as one of the key disciplines there. He was also a cofounder of the Santa Fe Institute. He made major behind-the-scenes contributions while working at both LLNL and LANL. He once remarked that one of the most difficult aspects of his life was maintaining that duality: total secrecy in defense work and the total intellectual openness that characterizes academic research.

A visionary with a fountain of ideas, Stirling was an inspiration to others and was especially generous to young scientists. His friends and colleagues remember him with warmth as they share Stirling stories.


DOI: **http://dx.doi.org/10.1063/PT.3.2523**