William M. Fairbank Biography

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Biography

William Fairbank was a pioneer and advocate of **gravity**research, **space** research, and condensed **matter** physics. In the late 1950s Fairbank accepted a position at Stanford University to assist in the establishment of a low **temperature** laboratory. Fairbank served as a professor of physics at Stanford from 1959-89.

In 1961 Fairbank was one of the discoverers of flux quantization. Fairbank was also instrumental in the development of an early type of superconducting accelerator that laid the engineering foundations for later **accelerators**.

In 1963 Fairbank agreed to serve on National Aeronautics and Space Administration's (NASA) first Physics Committee. In an effort to provide experimental evidence regarding the general theory of relativity, Fairbank and others worked on the Gravity Probe B Project that was designed to develop the procedures and technology that would enable researchers to make very sensitive measurements of gravity. The project, utilizing the principles of gyroscopic precession, became an important component in NASA's gravitational physics research program and a further confirmation of general **relativity theory**.

In the 1970s Fairbank and other scientists began to study the effects of gravity on the phase transition related critical point phenomena (e.g., changes in such properties as **viscosity** at or near a phase transition critical point). Of major interest were the potential effects of **microgravity** on such properties and transition. Microgravity describes the reduced gravity found in space. Although there is no region of space where **gravitational force** equals zero, as the distance from Earth increases, Earth's gravitational **force** decreases as an inverse square of the distance. Fairbank contributed his expertise derived from research in the normal fluid-superfluid critical point transition of **helium** where microchanges in gravity such as those found between the top and bottom of a flask created **pressure** differences that affected phase-sensitive transitions. Fairbank realized that for a sample to be able undergo more simultaneous phase transitions, a microgravity environment with a more uniform pressure was needed.

Along with other scientists Fairbank helped to design experiments related to critical phenomena experiments that were incorporated into NASA's Physics and Chemistry Experiments research program. In the 1980s Fairbank's work was incorporated with other research projects to form NASA's Microgravity Research Program. In particular, Fairbank designed the Lambda Point Experiment to explore the properties of microgravity. The experiment, one of the NASA microgravity program's first fundamental physics experiments, was performed aboard a 1992 flight of the space shuttle.