



Hannes Olaf Gösta Alfvén

1908 - 1995

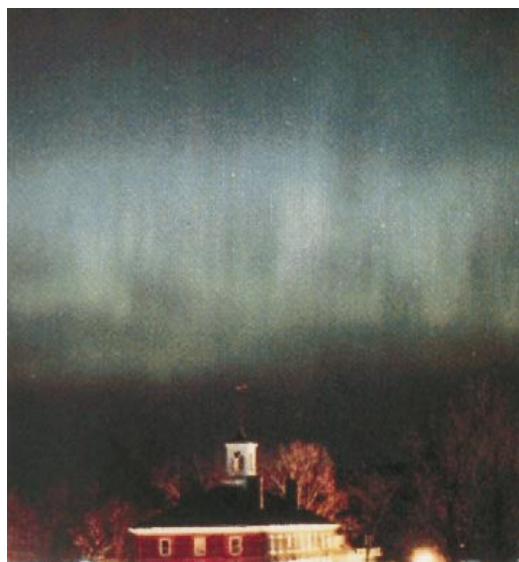
Awarded the Nobel Prize for Physics in 1970

Hannes Olaf Gösta Alfvén was the first space scientist to receive the Nobel Prize. He was noted for his pioneering theoretical research in the field of magnetohydrodynamics (MHD) - the study of electrically conducting fluids and their interactions with magnetic fields. MHD mainly concerns plasmas, i.e. ionized gases existing at the very high temperature and containing both free positive ions and free electrons.

Many of Alfvén's ideas came from his consideration of sunspots. In 1942 he proposed the existence of MHD waves in plasmas (Alfvén waves) and these were later confirmed. His ideas have been applied to plasmas in stars and in nuclear fusion reactors. He also explained in his early research *the aurora borealis*. The solar wind comprises a stream of particles ejected from the Sun; when these particles enter the Earth's magnetic field, they are diverted towards the poles, and their collisions in the ionosphere produce the auroral display.

Alfvén was born in Norrköping, Sweden, into a family of physicians. He said that there were two things that influenced him in an important way. One was that at an early age he read the Swedish edition of the French astronomer Camille Flammarion's book *Astronomie populaire*. The other was a widespread enthusiasm for radio. 'These two things shaped my life, astronomy and electronics...'.

Alfvén was educated at the University of Uppsala and later worked as a research physicist at the Nobel Institute of Physics. In 1940 he moved to the Royal Institute of Technology, Stockholm, becoming professor of electronics in 1945 and professor of plasma physics in 1963. After a disagreement with the Swedish government he accepted a professorship at the University of California, San Diego. Later he divided his time between the Institute of Technology and the University of California. He was a strong supporter of research on controlled thermonuclear reactions.



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In 1935, he married Kerstin Erikson, whom he had met while they were both students in Uppsala. They had five children and later nine grandchildren.

Alfvén's later works have dealt with the formation of the solar system. In his theory he hypothesised that planets were formed from the material captured by the Sun from an interstellar cloud of gas and dust. He argued against the current big-bang theory as the origin of the universe. According to him electromagnetic forces caused the plasma to condense into galaxies. As for expansion of the universe, he attributes this to the energy released by the collision of matter and antimatter. Not everyone shared his cosmological views.

In addition to his scientific papers, he wrote popular science books, sometimes with his wife. Under the name Olaf Johannesson, he wrote a science fiction novel, *The Great Computer: A Vision* (1968), which describes how increasingly sophisticated computers gain control firstly over governments and then over the Earth.

Although he started as a supporter of the development of nuclear power as an energy source for Sweden, later he actively opposed the use of nuclear energy. He was active in Pugwash, and later its president.

Alfvén is remembered as a reliable colleague and an entertaining companion.