Biographical Encyclopedia of Astronomers

Dirac, Paul Adrien Maurice

Born Bristol, England, 8 August 1902

Died Tallahassee, Florida, USA, 20 October 1984

British theoretical physicist Paul Dirac is known within astronomy primarily for the hypothesis that certain ratios of fundamental constants (called "large numbers" because some of them are on the order of 10^{40}) should not change as the Universe expands. Raised in Bristol by an English mother and Swiss father, Dirac was recognized as being bright at an early age. He obtained an engineering degree in 1921 and a mathematics degree in 1923, both from Bristol, then moved to Cambridge to pursue research. Dirac was awarded a Ph.D. in 1926 for work on quantum mechanics, with 11 papers already published He produced the Dirac equation in 1928 and his text *The Principles of Quantum Mechanics* in 1930. He was made Lucasian Professor of Mathematics at Cambridge University in 1932, and remained in that position until 1969, when he moved to Florida State University. Dirac received the Nobel Prize in Physics in 1933 for correctly predicting the existence of the positron.

One of Dirac's earliest papers was on Compton scattering in stellar atmospheres, in 1925. Of course, his major work was on unifying quantum mechanics with relativity theory, which led to the notion of antiparticles. But he also made many other theoretical contributions, the most relevant to astrophysics being his 1938 paper presenting a model based on a set of coincidences between atomic and cosmic physics. Although the model itself was quite speculative and was ultimately ruled out by constraints on the variation of the gravitational constant, it was a remarkably inspirational hypothesis that continues to have relevance for some of today's cosmological theories

Dirac appears not to have interacted easily with students. The best known of them was Fred Hoyle, who, however, did not take a formal Ph.D. degree.

In addition to receiving the Nobel Prize, Dirac received honors from the Royal Society of London, the USSR Academy of Sciences, and the United States National Academy of Sciences. His style of nonscientific conversation was uniquely terse and gave rise to a large number of "Dirac stories" (many of them verifiable), of which the punchline was invariably Dirac uttering one or two words in a context where others would have gone on for paragraphs.

Douglas Scott

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