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Summary Article: **Penzias, Arno Allan**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

German-born US radio engineer who, with the radio astronomer Robert Wilson, was awarded the Nobel Prize for Physics in 1978 for the discovery in 1964 of cosmic microwave background radiation. This radiation had been predicted on the basis of the 'hot Big Bang' model of the origin of the universe initially proposed in 1948.

Life Penzias was born in Munich, Bavaria. His parents left Nazi Germany for the USA, and Penzias studied at the City College of New York, earning his BA in physics in 1954, and Columbia University, New York, where he was awarded his MA in 1958 and his PhD in 1962. In 1961 he joined the staff of the Radio Research Laboratory of the Bell Telephone Laboratories in New Jersey, becoming director in 1976 and was vice-president of research 1981–95. He became vice-president and chief scientist of Bell Labs Innovations in 1996. He has held a series of academic positions at Princeton University, New Jersey, and Harvard University, Cambridge, Massachusetts.

The discovery of background radiation In 1963, Penzias and Wilson were assigned by Bell to the tracing of radio noise that was interfering with the development of a communications programme involving satellites. They detected a surprisingly high level of microwave radiation which had no apparent source (that is, it was uniform in all directions). The temperature of this background radiation was 3.5 K (−269.7°C/−453.4°F), later revised to 2.735 K (−270.4°C/−454.7°F).

They took this enigmatic result to physicist Robert Dicke at Princeton, who had predicted that this sort of radiation should be present in the universe as a residual relic of the intense heat associated with the birth of the universe following the Big Bang. His department was in the process of constructing a radio telescope designed to detect precisely this radiation when Penzias and Wilson presented their data.

Later work Penzias's later work has been concerned with developments in radio astronomy, instrumentation, satellite communications, atmospheric physics, and related matters.

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