The Cosmic Microwave Background Radiation with a Temperature of 2.75 Kelvin Is a Proof Against the Big Bang, Since It Was Predicted Earlier and Better by an Infinite Universe Without Expansion, Than the Predictions Based on the Big Bang

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According to the textbooks, one of the pillars of the big bang is the prediction of the temperature of the CMBR before its discovery by Penzias and Wilson in 1965.

Is this true?

Here are the facts, that is, the predictions made by the big bang theory:

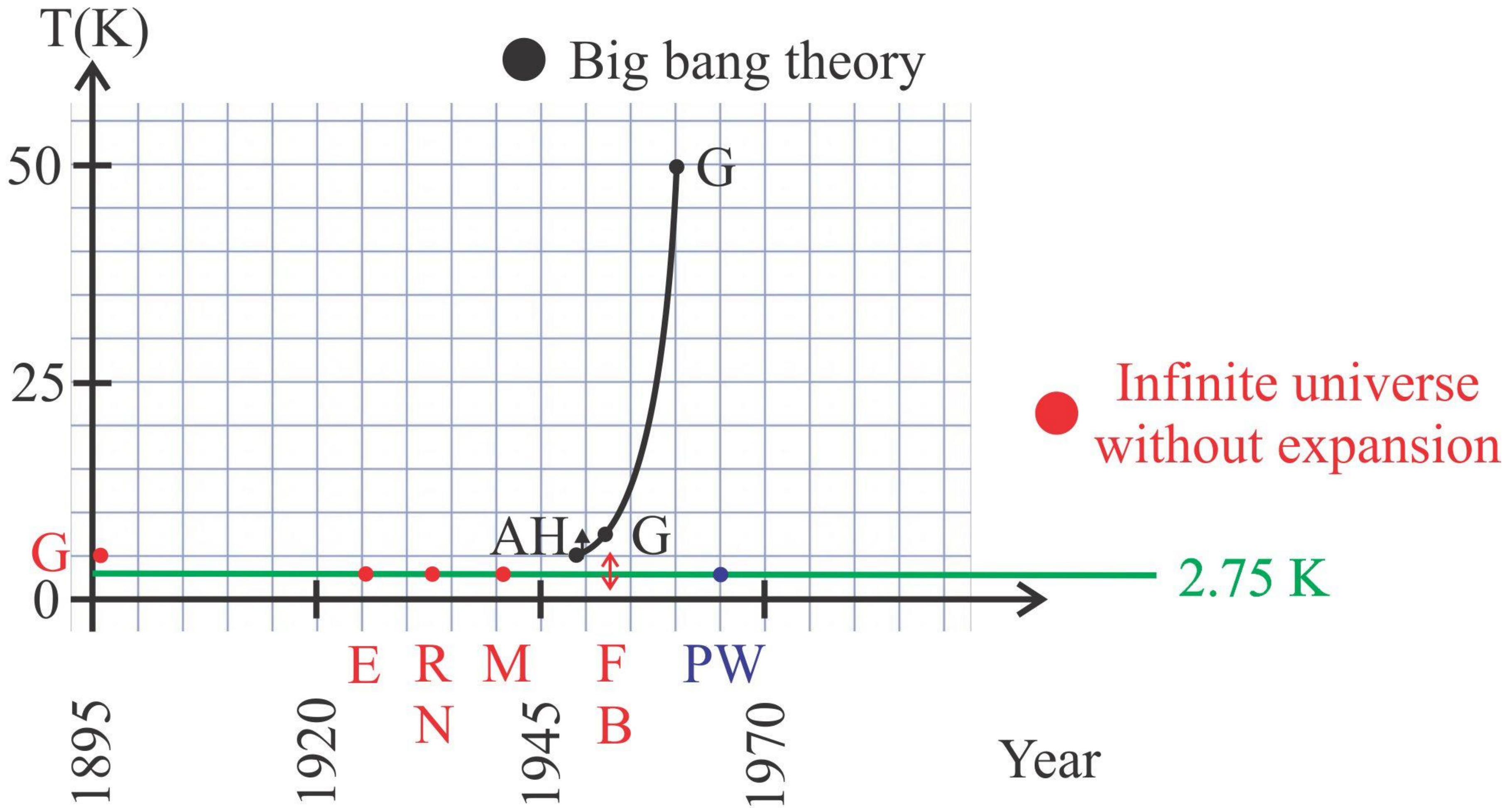
1948 – Alpher and Hermann: $T = 5$ K
1949 – Alpher and Hermann: $T > 5$ K
1953 – Gamow: $T = 7$ K
1961 – Gamow: $T = 50$ K

Then in 1965 Penzias and Wilson measured $T = (3.5 \pm 1.0)$ K with a horn antena built to study radio astronomy.

However:

Predictions based on an infinite universe without expansion and without big bang:

1896 – Guillaume: 5.6 K, before Gamow's birth (1904)
1926 – Eddington: 3.2 K
1933 and 1938 – E. Regener and W. Nernst: 2.8 K
1941 – McKellar and Herzberg 2.3 K
1953-1954 – Finlay-Freundlich: 1.9 K < T < 6.0 K
1954 – Max Born: "Thus the redshift is linked to radio-astronomy."



T(K)
Big bang theory
50
25
0
G
G
AH
G
2.75 K
Infinite universe
without expansion
E
R
N
M
F
B
PW
1895
1920
1945
1970
Year

The Stefan-Boltzmann law is due empirically to Josef Stefan in 1877 and theoretically to Ludwig Boltzmann in 1884:

The total energy radiated per unit surface area per unit time across all wavelengths for a black body is directly proportional to the fourth power of the body's temperature T:

$$M = \sigma T^4$$

where

$$\sigma = 5.67 \times 10^{-8} W m^{-2} K^{-4}$$

$$\text{radiation energy density} = \frac{\text{radiant energy}}{\text{unit volume}} = \frac{4}{c}\sigma T^4$$

Charles Édouard Guillaume (1861-1928), Swiss physicist, head of the International Bureau of Weights and Measures, president of the French Physical Society, 1920 Nobel prize in physics "in recognition of the service he has rendered to precision measurements in physics by his discovery of anomalies in nickel steel alloys".

C. E. Guillaume, La température de l'espace, La Nature, Vol. 1214, pp. 210-211 and 234 (1896).

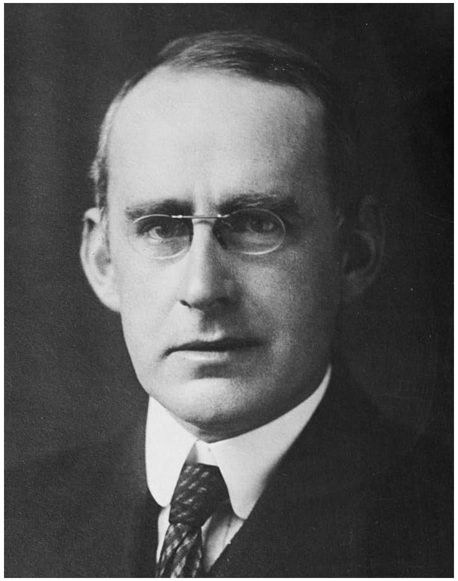
English translation in: A. K. T. Assis and M. C. D. Neves, Amer. J. Phys., Vol. 88, pp. 1140-1144 (2020). DOI: 10.1119/10.0001775.

Guillaume considered a black body which is in interstelar space far from other stars. By assuming an equilibrium state in which the radiation received by this body from the stars around it would be equal to the radiation emitted by the body according to the Stefan-Boltzmann's law, he arrived at a temperature of 5.6 K utilizing the measured energy density of the stars of the Milky Way:

"We conclude that the radiation of the stars alone would maintain a test particle we suppose might have been placed at diferent points in the sky at a temperature of 5.6 absolute."

Arthur Eddington (1882-1944), English astronomer, physicist, and mathematician.

Book: “The Internal Constitution of the Stars” (1926). Last Chapter (Diffuse matter in space). Section on The Temperature of Space:



“The total radiation received from the stars has an energy-density of 7.67 x 10^{-13} ergs/cm^3. By the formula $E = aT^4$ the effective temperature corresponding to this density is 3.18 K. In a region of space not in the neighbourhood of any star this constitutes the whole radiation field of radiation, and a black body, for instance, a black bulb thermometer, will there take up a temperature of 3.18 K so that its emission may balance the radiation falling on it and absorbed by it. This is sometimes called the temperature of interstelar space.”

Edwin Hubble (1889 – 1953), American astronomer.

Hubble found Cepheid variable stars in several nebulae, including the Andromeda Nebula. His observations, made in 1924, proved conclusively that these nebulae were much too distant to be part of the Milky Way and were, in fact, entire galaxies outside the Milky Way galaxy.

Erich Regener (1881-1955), German physicist.

He was known primarily for the design and construction of instruments to measure cosmic ray intensity at various altitudes.

According to the Italian-American experimental physicist Bruno Rossi:

"In the late 1920s and early 1930s the technique of self-recording electroscopes carried by balloons into the highest layers of the atmosphere or sunk to great depths under water was brought to an unprecedented degree of perfection by the German physicist Erich Regener and his group. To these scientists we owe some of the most accurate measurements ever made of cosmic-ray ionization as a function of altitude and depth."

In 1933, analysing the measured energy of cosmic rays arriving on Earth, Regener arrived at the temperature of intergalactic space:

"A celestial body which has sufficient dimensions to absorb the cosmic radiation [...] is heated by means of this cosmic radiation. The heating results to be proportional to the energy S_U from the cosmic radiation and to the surface O [of the body]. It is heated until it emits the same amount of radiation, so that the black radiation becomes equal to $\sigma T^4 O$. The final temperature is determined by $T = \sqrt[4]{S_U/\sigma}$ and is found to be 2.8 K."

Walther Nernst (1864-1941), German physical chemist, father of the third law of thermodynamics (1906), Nobel prize in chemistry in 1920 “in recognition of his work in thermochemistry”.

He advocated in 1937-1938 a boundless infinite universe, homogeneous in large scale and without expansion. He assumed that the cosmological redshift was due to a tired light effect and not due to a Doppler effect.

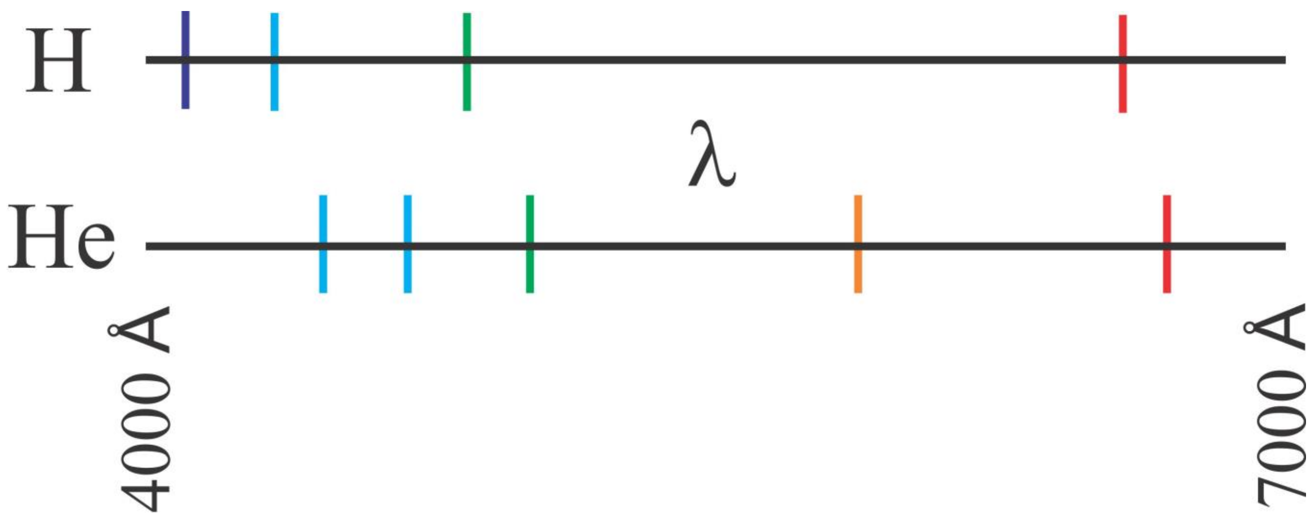
He quoted Regener’s paper with a temperature of intergalactic space of 3 K.

Andrew McKellar (1910-1960), Canadian astronomer.
In 1940 he made the first identification of molecular matter in the interstellar medium, identifying the spectrum of the organic cyano radical (CN). In 1941 his analysis of the spectra of the cyano radical showed that the surrounding space was very cold with a temperature of approximately 2.3 K.

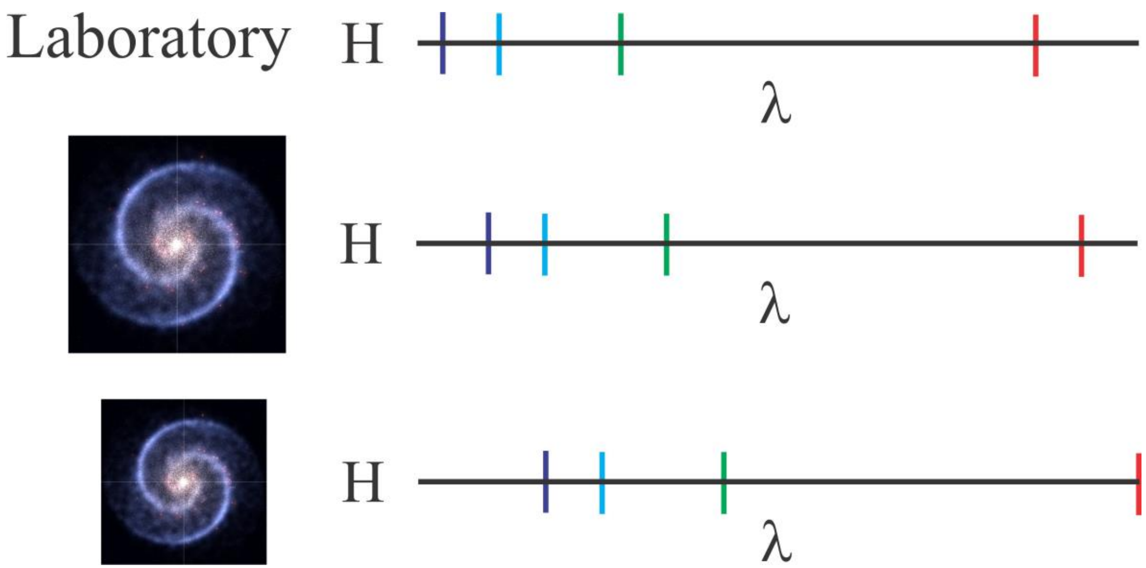
Gerhard Herzberg (1904-1999), German-Canadian physicist and physical chemist, 1971 Nobel prize in chemistry “for his contributions to the knowledge of electronic structure and geometry of molecules, particularly free radicals”.

In 1941 Herzberg quoted the temperature measurement of McKellar.

Each chemical element has a set of characteristic spectral lines. Examples of the emission spectrum of Hydrogen and Helium from 4,000 to 7,000 Angstrons, in the visible part of the spectrum:



Cosmological redshift



Conclusion: The smaller the angular size of a galaxy, the greater the redshift of the spectral lines for each element.

$$\text{redshift} = z = \frac{\lambda_O - \lambda_L}{\lambda_L}$$

Erwin Finlay-Freundlich (1885-1964), German astronomer.

E. Finlay-Freundlich, “Red shifts in the spectra of celestial bodies”, Phil. Mag., Vol. 45, pp. 303-319 (1954).

E. Finlay-Freundlich, “Red-shifts in the spectra of celestial bodies”, Proc.Phys. Soc. A, Vol. 67, pp. 192–193 (1954).

Max Born, “On the interpretation of Freundlich’s red-shift formula”, Proc. Phys. Soc. A, Vol. 67, pp. 193-194 (1954).

In 1953-1954 Freundlich proposed a tired light model to explain the intrinsic and anomalous redshifts of supergiant M-stars (T ~ 3,000 K), Solar lines (T = 6,000 K), White dwarfs (8,000 K < T < 40,000 K), A-stars (T ~ 10,000 K), B-stars (T ~ 20,000 K), O-stars (T ~ 30,000 K) and Wolf-Rayet stars (40,000 K < T < 100,000 K)

He proposed a redshift (perhaps due to photon-photon interaction) proportional to the density of the radiation field Stefan-Boltzmann's law (that is, proportional to the fourth power of the temperature) and to the length of path traversed through the radiation field:

$$\frac{\Delta\lambda}{\lambda} = AT^4\ell$$

where $A = 2\times10^{-29}\,\mathrm{cm}^{-1}\mathrm{degrees}^{-4}$ was fixed for B-stars and the same formula was applied successfully to all cases.

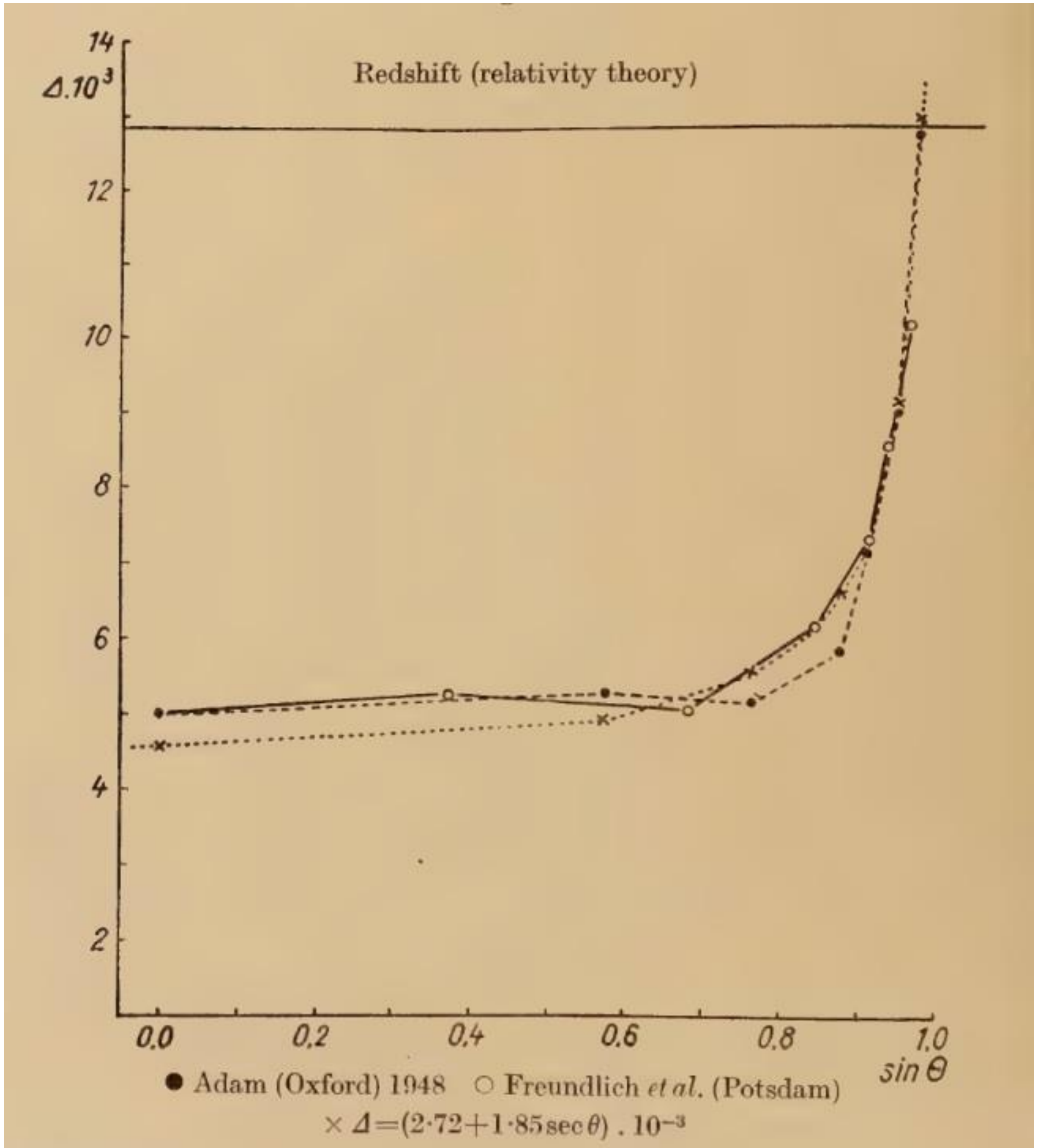
He then supposed that the same formula might be responsible to the cosmological redshift.

Equating $z = AT^4\ell$

with Hubble's law $z = H_o\ell$

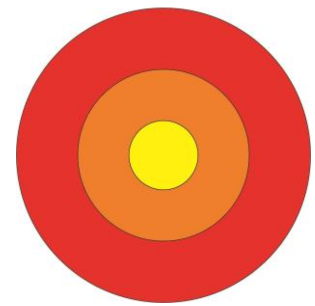
and utilizing the know values of the constants A and H_o he deduced a blackbody temperature for integalactic space between 1.9 K and 6 K.

"We may have, therefore, to envisage that the cosmological redshift is not due to an expanding universe, but to a loss of energy which light suffers in the immense lengths of space it has to traverse coming from the most distant star systems. Thus the light must be exposed to some kind of interaction with matter and radiation in intergalactic space."

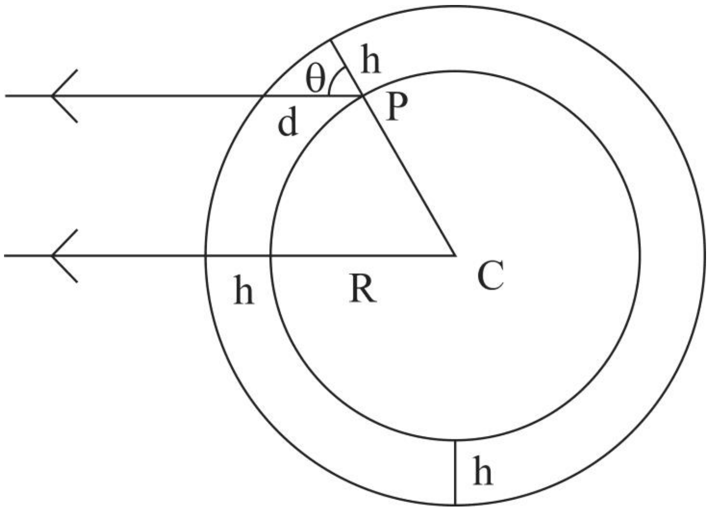


The red-shift Δ of solar lines as a function of the angle θ between the line of sight and the solar radius to the point where the line of sight cuts the solar surface. The horizontal line ($\Delta=0{\cdot}0129$) is the red shift according to the theory of relativity.

Qualitative representation of the redshift of the solar lines:



Redshift of the solar lines:



Angle θ between the line of sight and the solar radius to the point where the line of sight cuts the solar surface.
The length of path through the atmosphere of the sun is equal to

$$d \approx \frac{h}{\cos\theta} = h \sec\theta$$

where h << R is the length of path at the center of the sun. Theoretical best fitting of the experimental data:

$$z = \frac{\Delta\lambda}{\lambda} = (4.5 + 3.0 \sec\theta) \times 10^{-7}$$

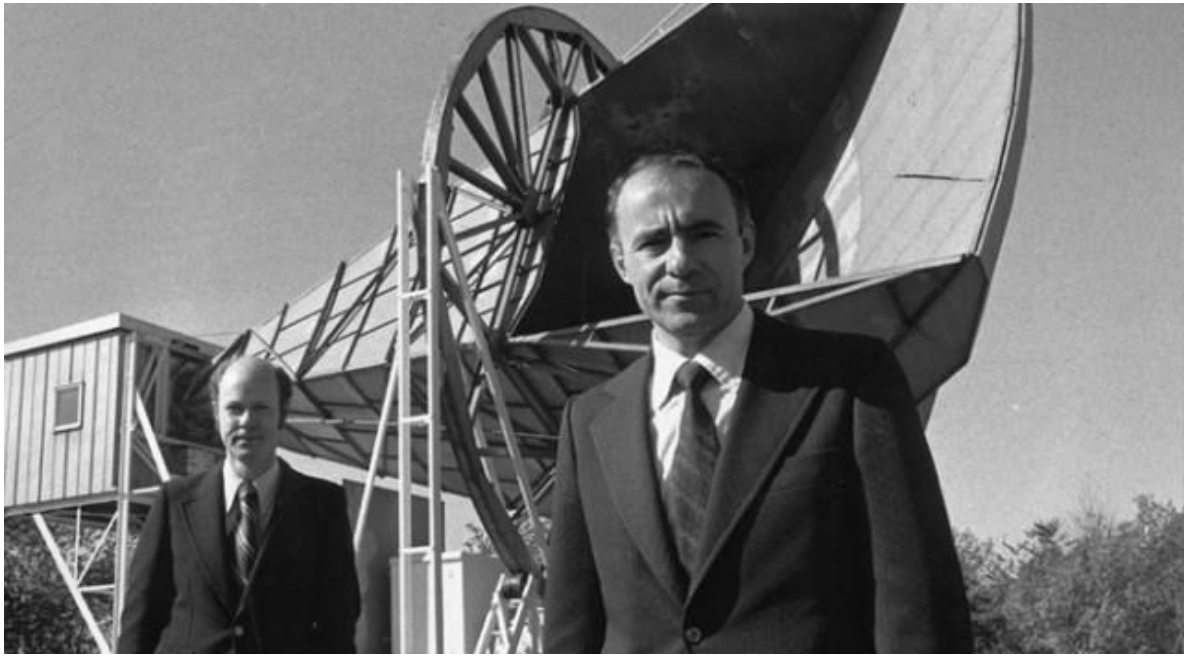
This result strongly suggests that the redshift of the solar lines must be due to some kind of interaction between the light and the medium present in the sun's atmosphere.

Max Born (1882-1970), German-British physicist, 1954 Nobel prize in physics "for his fundamental research in quantum mechanics, especially in the statistical interpretation of the wave function."

Max Born, On the interpretation of Freundlich's red-shift formula, Proc. Phys. Soc. A, Vol. 67, pp. 193-194 (1954):

"Thus the redshift is linked to radio-astronomy."

Then in 1965 Penzias and Wilson measured T = (3.5 ± 1.0) K with a horn antena built to study radio-astronomy!



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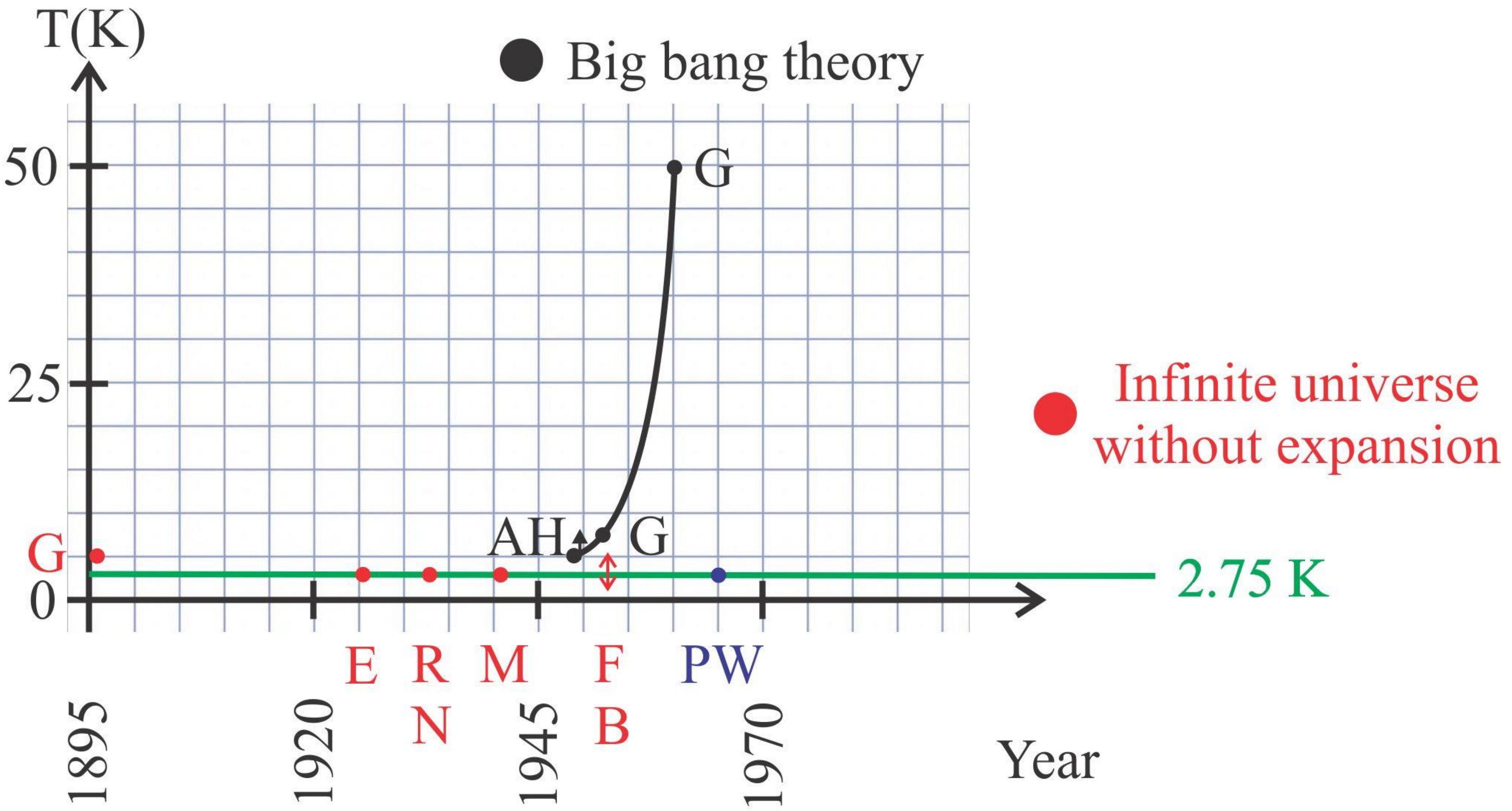
Conclusion: The cosmic microwave background radiation with a temperature of 2.75 Kelvin is a proof against the big bang, since it was measured and predicted earlier and better by an infinite universe without expansion, than the predictions based on the big bang.



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