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Cosmological redshift

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Abstract: The article describes the relationship of the cosmological redshift with the temperature of radiation distribution medium. The Fraunhofer absorption lines of a certain frequency are superimposed on the continuous spectrum of distant galaxy visible radiation by a hydrogen-distribution medium. These lines are shifted to the long-wave side, which indicates the change of hydrogen properties as a propagation medium, and not the properties of radiation itself (wavelength change), and these changes are associated primarily with temperature. And this, in its turn, suggests that the Universe is heated during its evolutionary development.

Keywords: spectrum, hydrogen, shift, galaxies, environment.

The cosmological (metagalactic) redshift observed for all distant sources (galaxies, quasars) is the decrease of radiation frequencies, explained as the dynamic removal of these sources from each other and, in particular, from our Galaxy, that is, as non-stationarity (the expansion) of the Metagalaxy.

Graphically, it looks like Fig.1.

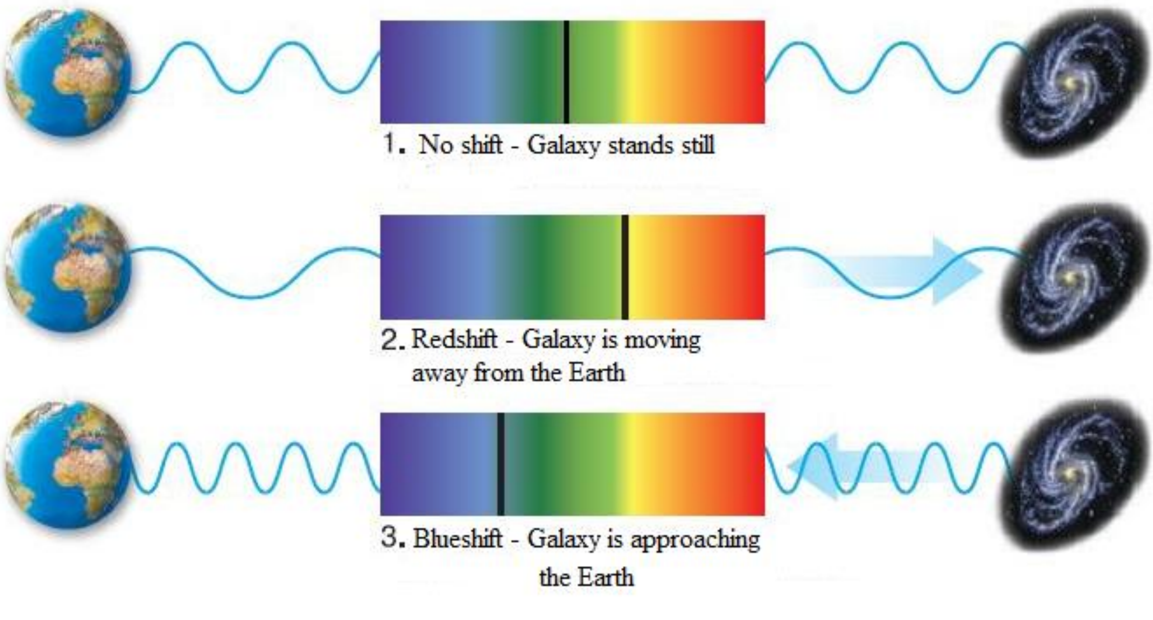

Fig.1. Graphic demonstration of cosmological redshift

The red shift for galaxies was discovered by the American astronomer Vesto Slipher in 1912-1914, and in 1929 Edwin Hubble discovered that the red shift for distant galaxies is greater than for nearby ones and increases approximately in proportion to the distance (Hubble law).

Various explanations were proposed for the observed displacement of spectral lines, for example, the hypothesis of tired light, but ultimately they associated it with the effect of intergalactic space expansion according to general relativity theory. This explanation of such a phenomenon is generally accepted.

Let's solve this issue.

The emission spectrum in the visible range of any galaxy is continuous one. Fraunhofer hydrogen absorption lines are superimposed on this spectrum. What does this mean? This means that some part of the waves of a certain length were absorbed by hydrogen. That is, some of the spectrum waves are lost when they approach the observer. Needless to say, this has nothing to do with the radiation process and is related to the galaxy environment. The environment of galaxies is the hydrogen environment, which absorbs part of the waves. I emphasize that this is the environment of those galaxies that directly emit the waves in the visible range. This radiation is recorded only if took place in vacuum directly to the observer, bypassing any other galaxies. If this was not the case, i.e. the radiation would pass through the substance, then it would be absorbed completely. Therefore, the imposition of Fraunhofer lines is strongly associated with the hydrogen surrounding the galaxies, which emit directly. But all the galaxies are surrounded by hydrogen. So why Fraunhofer lines are superimposed on different parts of visible radiation spectrum? And the farther the galaxy, the more Fraunhofer hydrogen absorption lines shift to the longer wavelength zone of the visible spectrum. There is only one explanation to this. The temperature of the hydrogen environment surrounding the galaxy is different. The lower the temperature of the absorption medium, the more Fraunhofer hydrogen absorption line shifts to the longer wavelength of the spectrum. This is proved by the spectral series of hydrogen emissions, which are located in all radiation ranges.

Spectral series of hydrogen

Studied series:

Lyman series

This series was discovered by T. Lyman in 1906. All lines of the series are in the ultraviolet range. The series corresponds to the Rydberg formula with n′ = 1 and n = 2, 3, 4, ...; the line Lα = 1216 Å is the resonant line of hydrogen. The border of the series is 911.8 Å.

Balmer series

This series was discovered by I.Ya. Balmer in 1885. The first four lines of the series are in the visible range and were known long before Balmer, who proposed the empirical formula for their wavelengths and predicted the existence of other lines of this series on its basis in the ultraviolet range. The series corresponds to the Rydberg formula at n′ = 2 and n = 3, 4, 5, ...; Hα line makes 6565 Å; the series boundary makes 3647 Å.

Paschen series

This series was predicted by Ritz in 1908 based on the combinational principle. It was discovered by F. Paschen in the same year. All lines of the series are in the infrared range. The series corresponds to the Rydberg formula at n′ = 3 and n = 4, 5, 6, ...; the line Pα = 18 756 Å, the series boundary is 8206 Å.

Bracket Series

This series was discovered by F. S. Brackett in 1922. All lines of the series are in the near infrared range. The series corresponds to the Rydberg formula at n′ = 4 and n = 5, 6, 7, ...; Bα line = 40 522 Å. The border of the series makes 14 588 Å.

Pfund Series

It was discovered by A.G. Pfund in 1924. The lines of the series are in the near (some part in the mid one) infrared range. The series corresponds to the Rydberg formula at n′ = 5 and n = 6, 7, 8, ...; the line Pfα = 74 598 Å. The border of the series makes 22,794 Å.

Hampfrey Series

This series was discovered by K.D. Hampfrey in 1953. The series corresponds to the Rydberg formula at n′ = 6 and n = 7, 8, 9, ...; the main line makes 123 718 Å, the boundary of the series makes 32 823 Å.

The location of the series depends on the radiation temperature.

Conclusion: The Fraunhofer absorption lines of a certain frequency are superimposed on the (continuous) visible radiation spectrum of distant galaxies by a hydrogen-distribution medium. These lines are shifted to the long-wave side, which indicates the change of the distribution medium properties, and not the properties of the radiation itself (wavelength change), and these changes are primarily related to temperature. And this, in its turn, suggests that the Universe is heated in its evolutionary development.

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