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Light Dispersion and Pulsar Distance

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According to the Unified Absolute Relativity Theory, light speed in the vacuum is:

$$w = \pm\sqrt{c^2 - kf^2}$$

So, the dispersion time-delay between two different frequencies along the distance D is:

$$\Delta t = D\left(\frac{1}{w_A} - \frac{1}{w_B}\right) \quad \Leftrightarrow$$

$$\Leftrightarrow \quad \Delta t = \pm\frac{Dk\left(f_B^{\,2} - f_A^{\,2}\right)}{2c^3} \quad \Leftrightarrow$$

$$\Leftrightarrow \quad D = \frac{2c^3|\Delta t|}{k\left|f_B^{\,2} - f_A^{\,2}\right|}$$

If f is the average frequency and B the bandwidth:

$$D = \frac{c^3 \Delta t}{kBf}$$

In accordance with the data analysis we have done:

$$kf^{3.7} = 3.7 \times 10^{20}$$

Contrary to the orthodox idea, we found that the interstellar medium is almost uniform. It seams not to be uniform because the orthodox formula is wrong.

$$\Leftrightarrow \qquad D = 7.3\times10^{4}\,\frac{\Delta t f^{\,2.7}}{B} \qquad \text{(SI units)}$$

We have tested this formula against a lot of pulsar data and we found that it is correct, so interstellar dispersion became a good method of measuring the distance of variable emission objects.

To calculate the time delay, we have used the wrong but coherent old formula:

$$\Delta t = 8.24\times10^{3}\,\frac{B\times DM}{f^{\,3}} \qquad \text{(seconds)}$$

(B and f -- MHz; DM -- pc cc)

You can verify our formula using the data at:

- Google – arxiv:astro-ph/0504584 v1 26 apr 2005
- http://www.mpifr-bonn.mpg.de/div/pulsar/data/browser.html