Further implications of Willem de Sitter's study of spectroscopic binaries.

by David Bryan Wallace

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Abstract

Willem de Sitter's study of spectroscopic binaries has been recognized as a falsification of ballistic theories of light. It also proves the uniqueness of the reference frame relative to which one-way speed of light is isotropic.

The original work

This work further analyses "Ein astronomischer Beweis für die Konstanz der Lichtgeschwindigkeit" by W. de Sitter. That work, published in *Physikalische Zeitschrift*, 14, 429 (1913), and in *Proceedings of the Royal Netherlands Academy of Arts and Sciences*, 1913, 15 II: 1297-1298, is available online and in translation.
Original German
English translation
English with animated graphic.

Starlight has nulls in the stellar spectrum, called Fraunhofer lines, due to absorption by gases surrounding the star. These nulls reveal composition of the star and, by the evident doppler shift, the movement of the star toward or away from the observer. Analysis of these spectral shifts routinely takes into account known movements of the observer; the residue reveals movement of the star. If the star is orbiting another body, then oscillations of the spectral shifts reveal the Keplerian motion of the star. If the velocity of light from the star were constant relative to the star, and the star is orbiting another body, then large oscillations in the time required for light to reach the observer due to the oscillating velocity would cause the spectral shifts to be radically different than are actually observed. The necessary conclusion is that the speed of light is constant relative to a frame of reference that does not change as the velocity of the star changes, and stellar spectroscopy has always relied on this fact. Emphatically, the speed of light from the star to the observer is c relative to a unique frame of reference.

A few deniers of the above proof subsequently suggested that the speed of light is emitted from the star at c relative to the star but is altered to c relative to intervening gasses, but no extinction signature of such intervening gases is seen.

The further analysis

If starlight had traveled from its stellar source to the observer at c relative to the observer, and if the observer is the orbiting Hubble Space Telescope, then the spectral shifts would deviate radically from the observed shifts, as above. The necessary conclusion is that the speed of light is constant relative to a frame of reference that does not change as the velocity of the observer changes, and stellar spectroscopy has always relied on this fact. Emphatically, the speed of light from the star to the observer is c relative to a unique frame of reference independent of both source and observer. This truth holds for observations regardless of direction.

Now, with the speed of light defined equal to c for a round trip of light, it logically follows that the isotropy of the one-way speed of light is a property of a unique frame of reference, historically, the luminiferous ether.

The isotropy of the one-way speed of light being a property of a unique frame of reference is at odds with the special theory of relativity. This is not new science. It is long established scientific fact that proponents of relativity theory have chosen to ignore.