Discourses

&

Mathematical Illustrations

pertaining to the

Extinction Shift Principle

under the Electrodynamics of

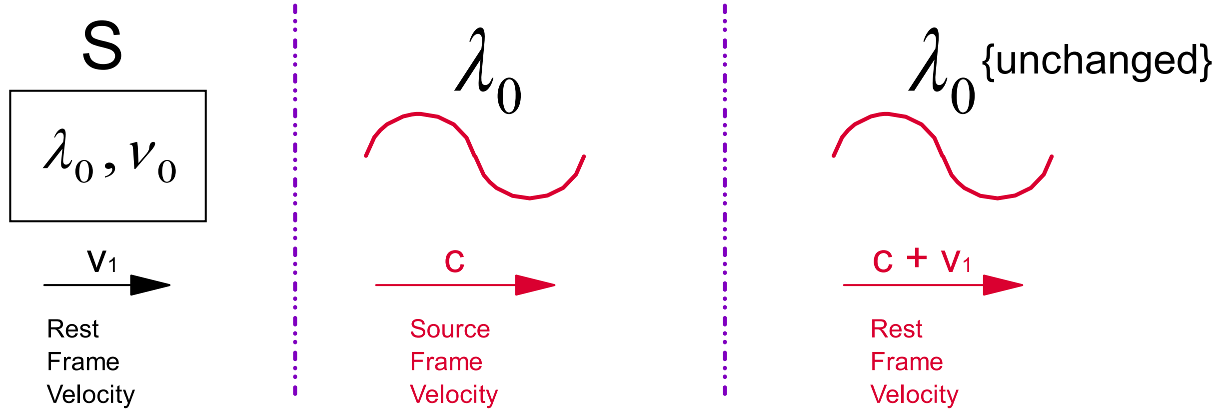
Galilean Transformations

Definition of *Extinction Shift*

Electromagnetism

Any wave of wavelength λ_0 and frequency ν_0 of a ***primary*** electromagnetic wave will propagate along an interference-free path with velocity c relative to its most **DIRECT** source **S** which moves with velocity v_1, but with velocity $\mathrm{c} + \mathrm{v}_1$ relative to the rest frame.

IDEAL VACUUM



The ***undisturbed*** wavelength λ_0 will remain unchanged {preserved in all other frames of reference}, along an interference-free path, independent of the source velocity.

Details: Refer to book: *Discourses & Mathematical Illustrations pertaining to the Extinction Shift Principle under the Electrodynamics of Galilean Transformations*
Dr. Edward Henry Dowdye, Jr. ISBN: **0-9634471-5-7**. **Web-Site http://www.extinctionshift.com**

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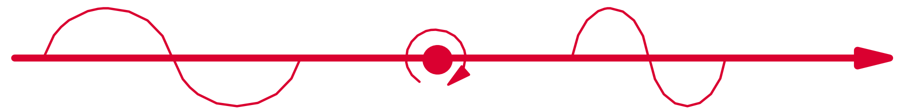

Electromagnetism

Upon interference, the *primary* wave of velocity c relative to **S** and wavelength λ_0 is extinguished via mater-wave interaction, thus terminating the interference-free path at the point of interference, namely, the **SECONDARY** source **S'** moving with velocity v_2.

Therefrom a *secondary* wave is re-emitted on the frequency $\nu' = \nu_0(1+\frac{v_1 - v_2}{c})$ as would be noted in the frame of reference of the *secondary* source.

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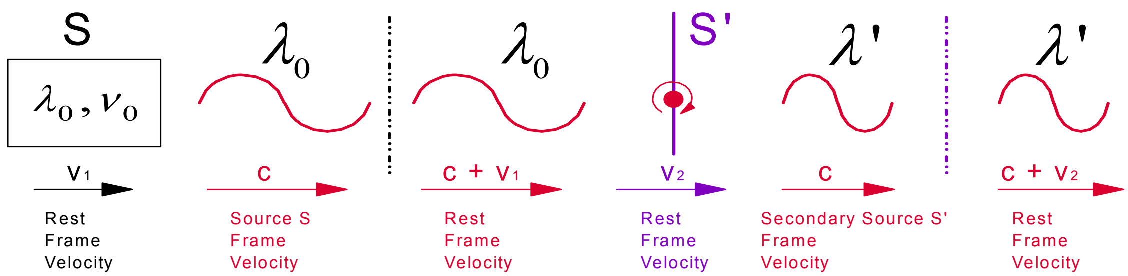

The re-emitted *secondary* wave will have the *undisturbed* wavelength $\lambda' = \frac{c}{\nu'} = \lambda_0(1+\frac{v_1 - v_2}{c})^{-1}$ {preserved in all frames} and will propagate along an interference free path with velocity c relative to **S'**, with velocity $c + v_2$ relative to the rest frame and with velocity $c + v_2 - v_1$ relative to **S.**

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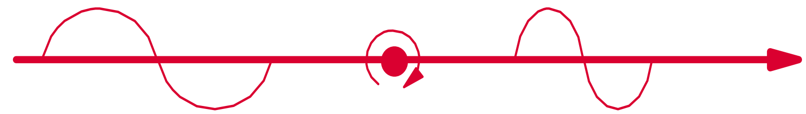

Electromagnetism

Similarly, upon interference, the *secondary* wave of velocity c relative to **S'** and wavelength λ' is extinguished via mater-wave interaction, thus terminating the interference-free path at the point of interference, namely, the **TERTIARY** source **S''** moving with velocity v_3. Therefrom a *tertiary* wave is re-emitted on the frequency $\nu'' = \nu'(1+\frac{\mathrm{v}_1-\mathrm{v}_2}{c})(1+\frac{\mathrm{v}_2-\mathrm{v}_3}{c})$ as would be noted in the frame of reference of the *tertiary* source moving with velocity v_3.

The re-emitted *tertiary* wave will have the *undisturbed* wavelength $\lambda'' = \frac{c}{\nu''} = \lambda_0(1+\frac{\mathrm{v}_1-\mathrm{v}_2}{c})^{-1}(1+\frac{\mathrm{v}_2-\mathrm{v}_3}{c})^{-1}$ {preserved in all frames} and will propagate along an interference free path with velocity c relative to **S''** and with velocity $c+\mathrm{v}_3$ relative to the rest frame.

Similarly, any N-ary wave will be re-emitted with velocity c relative to its N-ary source of velocity v_N and will propagate with velocity $c+\mathrm{v}_N$ relative to the rest frame.

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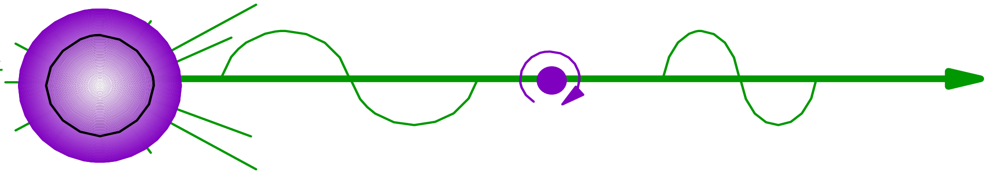
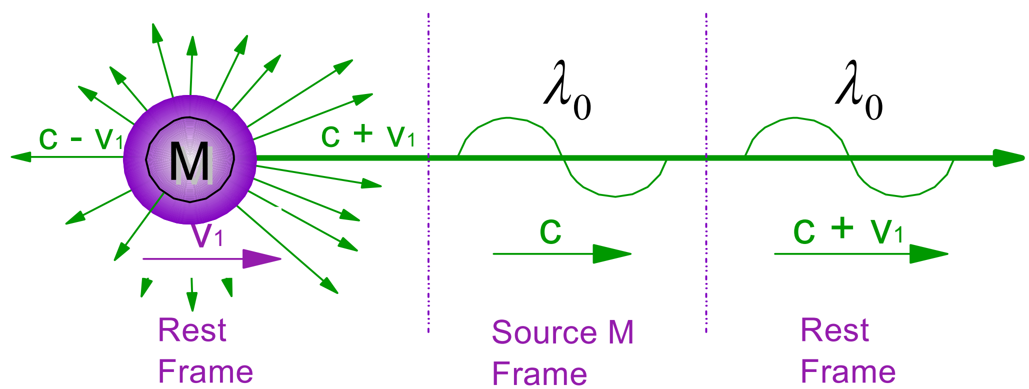


Gravitation

A gravitation field set up by a mass particle M will propagate along an interference free path with velocity c relative to its most DIRECT source M which move with velocity v_1 relative to the rest frame. Analogous to the case of electromagnetism, any information on M, as can be extracted from the *primary* gravitational wave of wavelength λ_0 would propagate with velocity c relative to M, moving with velocity v_1, but with velocity $c + v_1$ relative to the rest frame.



The *undisturbed* gravitational wavelength λ_0 will remain unchanged {preserved in all other frames of reference}, independent of the source velocity.

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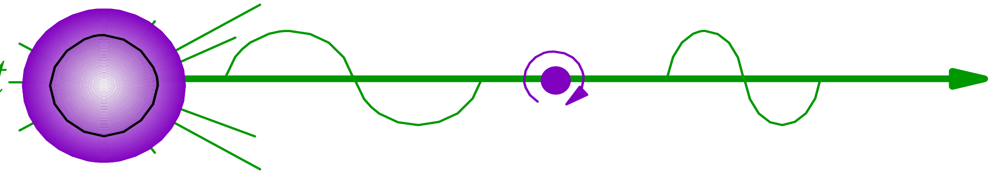
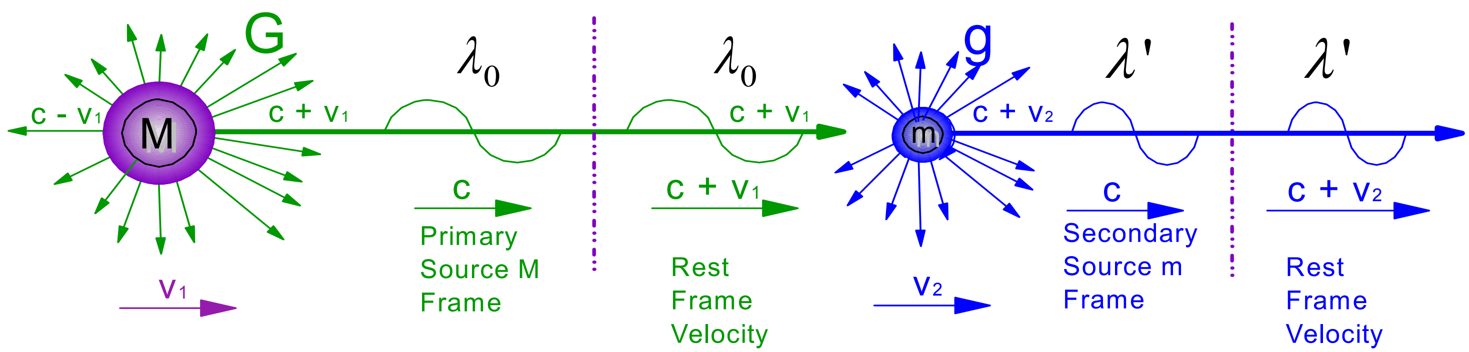
Definition of *Extinction Shift*



Gravitation



The *primary* gravitational wave, bearing information on its most DIRECT source, the mass particle M, propagates with velocity c relative to M which move with velocity v_1 relative to the rest frame. Assume the *primary* wave propagates with wavelength λ_0 and velocity $c + v_1$ relative to the rest frame. It would have the velocity $c + v_1 - v_2$ relative to the particle m, perturbing it, causing it to wiggle at the frequency $\nu' = \frac{c + v_1 - v_2}{\lambda_0} = \nu_0 (1 + \frac{v_1 - v_2}{c})$.

The gravitation set up by the wiggling m conveys *indirect* information on M via a *secondary* wave of wavelength $\lambda' = \frac{c}{\nu'} = \lambda_0 (1 + \frac{v_1 - v_2}{c})^{-1}$, propagating with velocity c relative to m, with velocity $c + v_2$ relative to the rest frame and velocity $c + v_1 - v_2$ relative to M.

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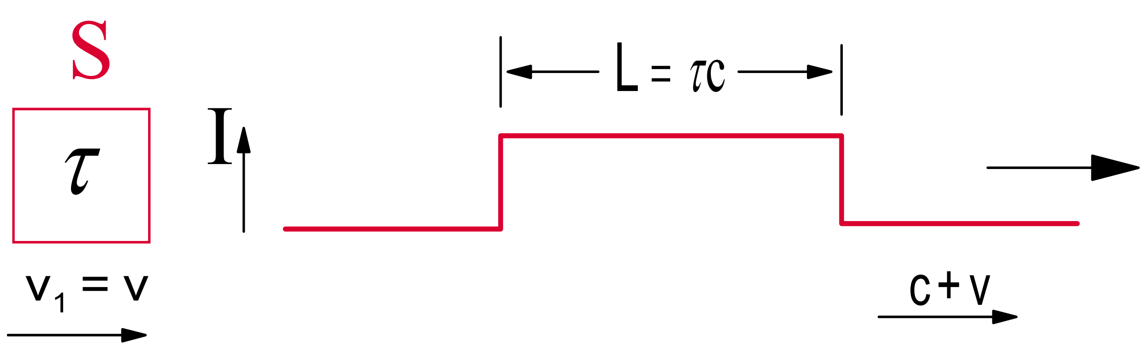
Extinction Shift Principle

Pure Classical Physics ▪ Euclidean Space ▪ Galilean Transformations

AXIOM 1 Let a resting *hypothetical observer* of velocity $v_0 = 0$ read the output of an experiment and note the *undisturbed* light pulse of intensity **I,** created by the moving source **S** of velocity $v_1 = v$. The time duration of the pulse of length L in the frame of reference of **S** is $\tau = \frac{L}{c}$ and is moving with velocity c relative to **S**. The *hypothetical observer* would note the time duration of $\tau' = \tau(1 + \frac{v_1 - v_0}{c})^{-1}$ of the light pulse and its *undisturbed* velocity $c + v_1 - v_0 = c + v$.



Fixed $v_0 = 0$
Hypothetical
Observer Notes

$$\tau' = \frac{L}{c+v} = \tau(1 + \frac{v}{c})^{-1}$$

and

$$L' = L$$

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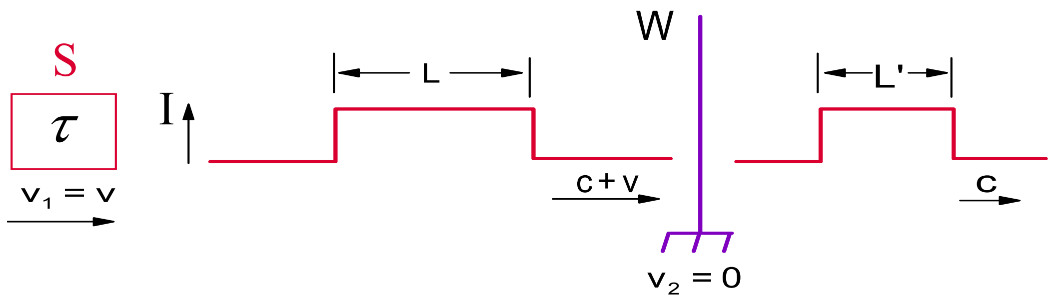
AXIOM 2 The *undisturbed* primary light pulse of length **L** from the *primary* moving source **S** ($v_1 = v$) is incident at a fixed window **W** ($v_2 = 0$) with the relative velocity $c + v_1 - v_2 = c + v$. The *primary* pulse is absorbed and propagated in the window medium with an *effective* velocity of c / n , where n is the index of refraction of the window medium. A new pulse is then re-emitted by **W**, a **new** *secondary* source, with velocity $c + v_2 = c$ relative to the rest frame.

In the process of re-emission, from the *primary* moving source **S** to the fixe *secondary* source **W,** the velocity of propagation is shifted by the factor $\frac{c}{c+v} = (1 + \frac{v}{c})^{-1}$ from the *primary* to *secondary* wave.

The time duration for the illumination of the incident face of the window by the *primary* pulse and the emission of the *secondary* pulse at the other face remains unchanged. Thus, the *extinction shift will result in a decrease/increase length of the re-emitted pulse by the factor* $(1 \pm \frac{v}{c})^{-1}$ *for an approaching/receding light source of velocity* $\pm v$.

Hence, only the *extinction shifted* pulse of length $L' = L(1 + \frac{v}{c})^{-1}$ is measurable for the approaching source **S**!



Fixed $(v_0 = 0)$
Hypothetical
Observer Notes

$\tau' = \frac{L}{c+v} = \tau(1 + \frac{v}{c})^{-1}$

and

$L' = L(1 + \frac{v}{c})^{-1}$

The *primary* pulse of length L is **not** measurable!

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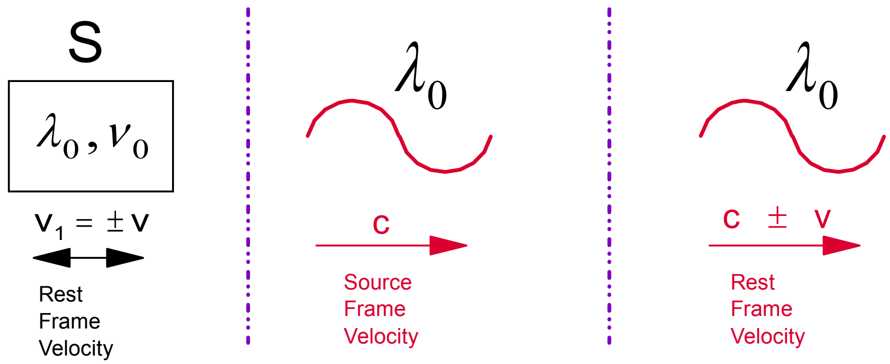
AXIOM 3 Let a resting *hypothetical observer* of velocity $v_0 = 0$ read the output of an experiment and note the *undisturbed* wavelength created by the moving primary source **S** of velocity $v_1 = v$. The *hypothetical observer* would note that the *undisturbed, extinction free* **primary** wave of wavelength λ_0 is independent of both the source **S** velocity v_1 and the *hypothetical observer*'s own velocity v_0 .



Hypothetical Observer ($v_0 = v_1$)
in S frame notes

$$\nu' = \nu_0\left(1 + \frac{v_1 - v_0}{c}\right) = \nu_0$$

$$\lambda' = \lambda_0$$

Hypothetical Observer ($v_0 = 0$)
in rest frame notes

$$\nu' = \nu_0\left(1 \pm \frac{v}{c}\right)$$

$$\lambda' = \lambda_0$$

The *undisturbed* wavelength λ_0 does **not** depend on the frame of reference!

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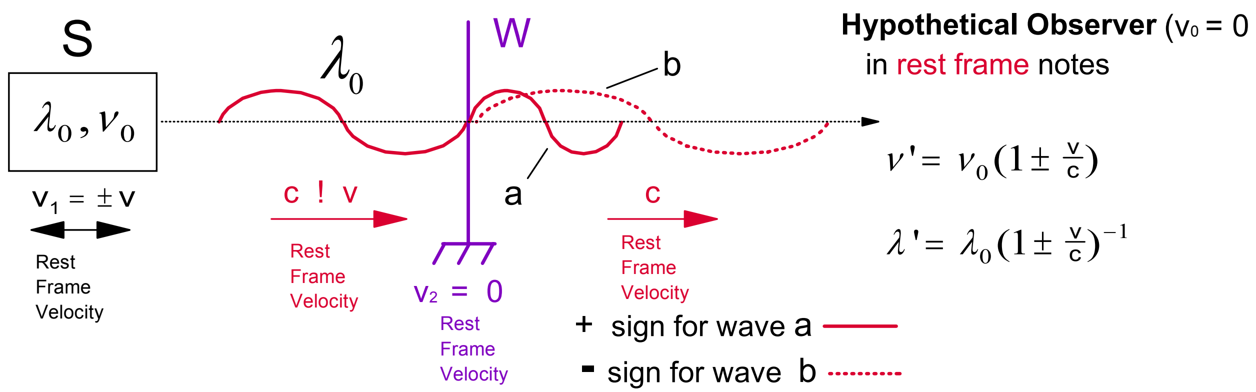
AXIOM 4 Any measurement on the primary *undisturbed* wave by ordinary means would cause the velocity and wavelength of the primary wave from the primary source **S** of velocity $v_1 = \pm v$ to be re-emitted. The primary wave is *extinguished* and re-emitted with velocity **c** relative to the secondary source, namely, the window **W**. The dipoles in the window medium become secondary sources of emission and vibrate in phase with the wave incident at the boundary of **W**. The *secondary* wave is re-emitted with velocity **c** relative to its interference, namely, its secondary source **W**, but with velocity $c \pm v$ relative to the rest frame. **The relative frequency of the *primary* wave is unaltered during the process of re-emission into a *secondary* wave at the interference { W }, as would be noted by any observer in the frame of reference of the interference!**



Any measurement on the primary *undisturbed* wave of wavelength λ_0 by ordinary means would result in an observation of an *extinction shifted* wave of wavelength λ' !!! {**WINDOW AXIOM**}.

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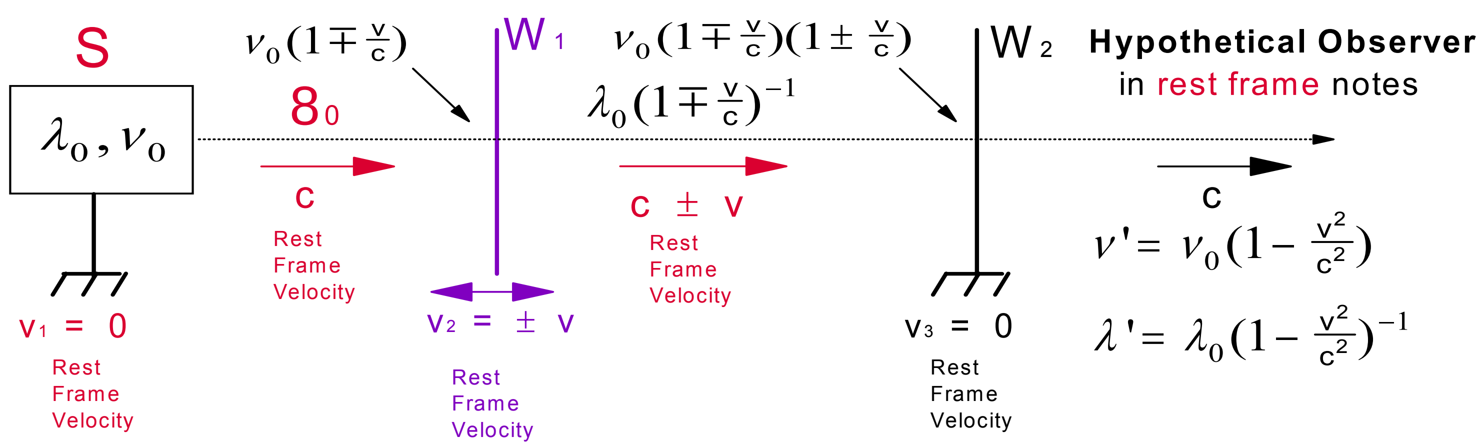
AXIOM 5 The window W_1 recedes/approaches a fixed primary source **S** that is at rest ($v_1 = 0$) and is illuminated at the relative frequency $\nu_0(1 \mp \frac{v}{c})$ by **S** whose frequency is ν_0 . W_1 then re-emits a **new** wave on the frequency $\nu_0(1 \mp \frac{v}{c})(1 \pm \frac{v}{c}) = \nu_0(1 - \frac{v^2}{c^2})$ with velocity $c \pm v$ relative to the rest frame as would be noted by an observer in that frame of reference. A fixed W_2 extinguishes this wave and then re-emits a **new** wave on the relative frequency $\nu_0(1 - \frac{v^2}{c^2})$ of W_1 as would be perceived in the reference frame of W_2 with velocity c relative to W_2.



The frequency noted at the output of a moving window is always a red shifted frequency $\nu' = \nu_0(1 - \frac{v^2}{c^2})$,
and is independent of the direction of the window motion. {**WINDOW AXIOM**}.

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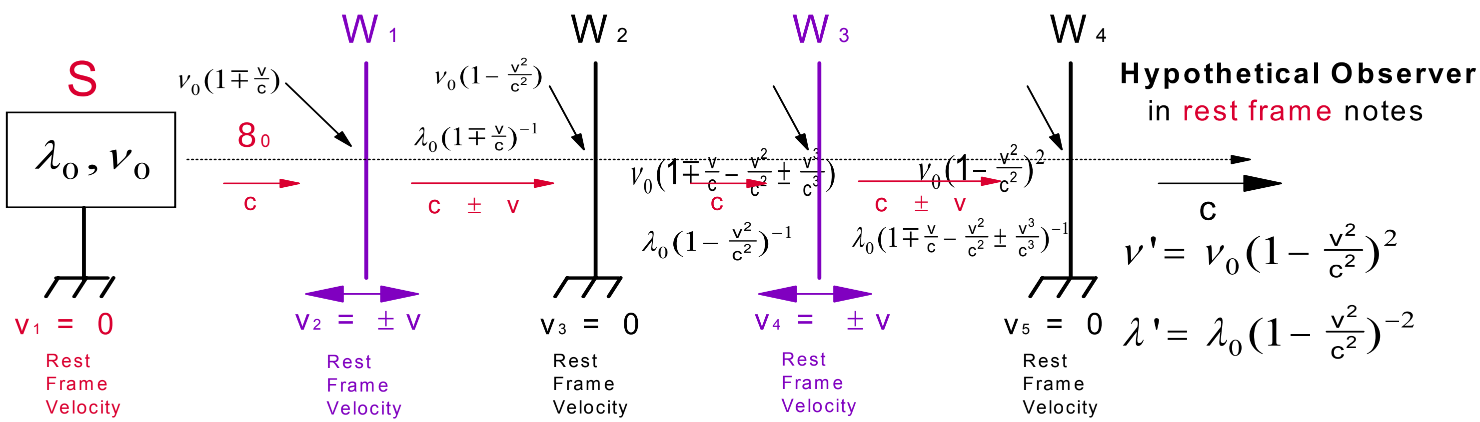
AXIOM 6 A second moving window W_3 recedes/approaches a fixed secondary source W_2 that is at rest ($v_3 = 0$) and is illuminated at the relative frequency $\nu_0(1 \pm \frac{v}{c} - \frac{v^2}{c^2} \mp \frac{v^3}{c^3})$ by W_2 whose frequency is $\nu_0(1 - \frac{v^2}{c^2})$, the output of the experiment in **AXIOM 5**. W_3 then re-emits a **new** wave on the frequency $\nu_0(1 - \frac{v^2}{c^2})(1 \pm \frac{v}{c}) = \nu_0(1 - \frac{v^2}{c^2})^2$ with velocity $c \pm v$ relative to the rest frame as would be noted by an observer in that frame of reference. A fixed W_4 extinguishes this wave and then re-emits a **new** wave on the relative frequency $\nu_0(1 - \frac{v^2}{c^2})^2$ of W_3 as would be perceived in the reference frame of W_4 with velocity c relative to W_4.



The frequency noted at the output of **two** moving windows separated by fixed interference $\nu' = \nu_0(1 - \frac{v^2}{c^2})^2$, and is again independent of the direction of the window motion. {**WINDOW AXIOM**}.

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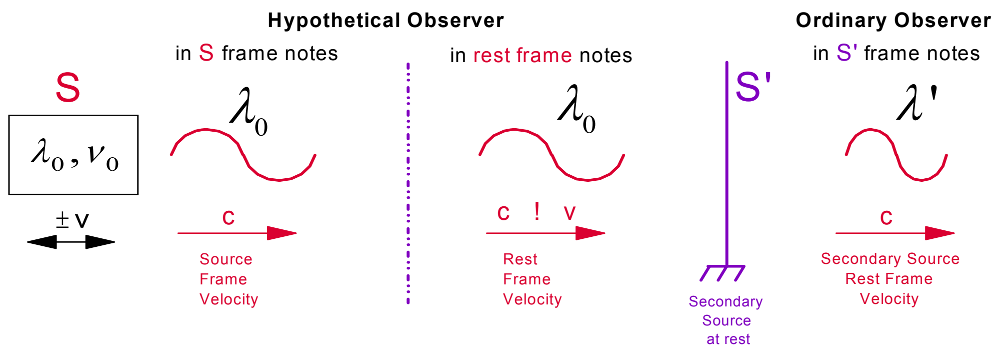
INVARIANCE of the *WAVE EQUATION*

$$\frac{\partial^2\Phi}{\partial x^2}+\frac{\partial^2\Phi}{\partial y^2}+\frac{\partial^2\Phi}{\partial z^2}-\frac{1}{c^2}\frac{\partial^2\Phi}{\partial t^2}=0$$



The *hypothetical observer* would find $\Phi = \Phi_0 Sin 2\pi(\nu t + \frac{1}{\lambda}x)$ to be a solution of the wave equation of the *primary* wave at velocity c relative to **S**, where $\nu\lambda = c$, but at velocity $c' \neq c$ relative to the rest frame. The *ordinary observer* would find $\Phi' = \Phi'_0 Sin 2\pi(\nu' t' + \frac{1}{\lambda'}x')$ to be a solution of the wave equation of the *secondary* wave at velocity c relative to **S'**.

{**Important Note!!!**: There is **no** time dilation in ***Euclidean Space*** under electrodynamics of ***Galilean Transformations!*** Thus $t' = t$.}

Both the *hypothetical* and the *ordinary* observer would find that the velocity of the wave being observed is always

$\nu'\lambda' = [\nu(1 \pm \frac{v}{c})][\lambda(1 \pm \frac{v}{c})^{-1}] = \nu\lambda = c$ relative to its **most** primary source.

Differentiating the equation for Φ twice after t and x, the *hypothetical observer* gets $\frac{\partial^2\Phi}{\partial t^2} = -\Phi(2\pi)^2\nu^2 = \nu^2\lambda^2\frac{\partial^2\Phi}{\partial x^2}$ and

$\frac{\partial^2\Phi}{\partial x^2}+\frac{\partial^2\Phi}{\partial y^2}+\frac{\partial^2\Phi}{\partial z^2}-\frac{1}{\nu^2\lambda^2}\frac{\partial^2\Phi}{\partial t^2}=0$. The *ordinary* observer derives $\frac{\partial^2\Phi'}{\partial x'^2}+\frac{\partial^2\Phi'}{\partial y'^2}+\frac{\partial^2\Phi'}{\partial z'^2}-\frac{1}{\nu'^2\lambda'^2}\frac{\partial^2\Phi'}{\partial t'^2}=0$.

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