

Rotation Perpendicular to X and ϕ by Imaginary Angle α

Now it starts to become clear that the motion of the particle is actually in a five dimensional space (four physical dimensions and a time) and at the speed of light, being the three dimension motion just a drift.

The trigonometric functions associated with a relativistic Lorentz transformation are given in terms of velocity by:

$$\tan(\alpha) = \frac{v}{c} \quad (\text{A.1})$$

$$\left(\frac{1}{\lambda_{\tau}}\right)^2 = \left(\frac{1}{\lambda_{xPrime}}\right)^2 + \left(\frac{1}{\lambda_{\tauPrime}}\right)^2 \quad (\text{A.2})$$

With

$\frac{1}{\lambda_{\tau}} = \frac{m_0 c}{h}$ de Broglie wavelength for the particle on its own reference frame, traveling at the speed of light in the dimensional time τ direction.

Projection on the τ Prime direction.

$$\frac{1}{\lambda_{\tauPrime}} = \frac{1}{\lambda_{\tau}} \cos(\alpha)$$

Projection on the xPrime direction.

$$\frac{1}{\lambda_{xPrime}} = \frac{1}{\lambda_{\tau}} \sin(\alpha)$$

Equation (A.2) is the basic equation for the Quantization of Relativity.

It describes the motion of a particle as the interaction of two waves along dimensional time and three-dimensional space.

Figure 2 below displays the particle as a de Broglie wave oscillating as a function of Cosmological Time Φ , propagating along τ . This is a proper reference frame plot, that is, the particle is at rest at the origin and only travels along the dimensional time direction τ .

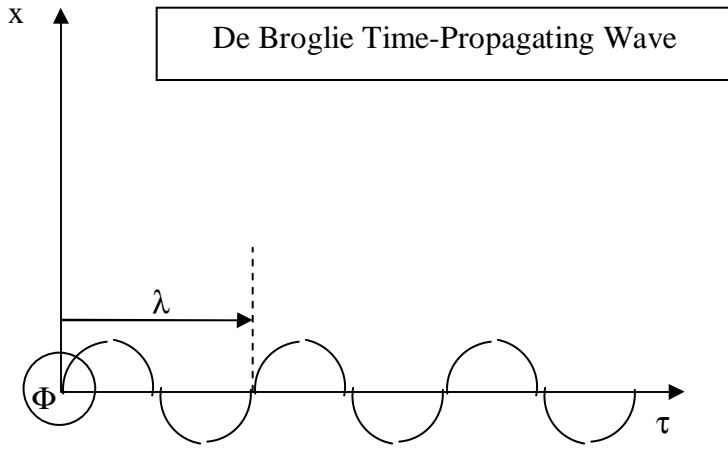
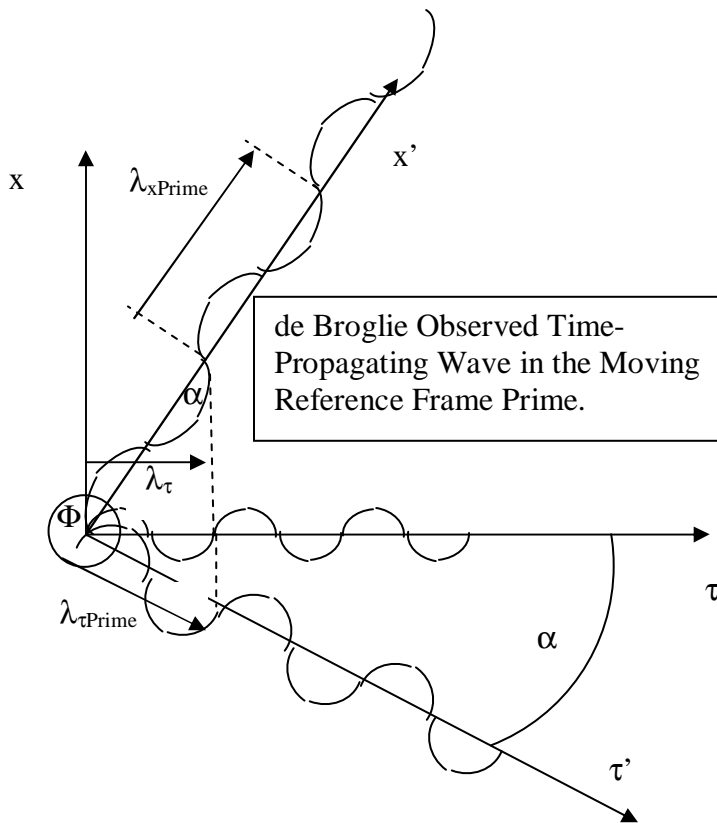


Figure 2. This model shows a de Broglie oscillation as a function of Cosmological Time Φ .



The diagram below represents the same observation from a moving frame of reference (relative velocity $c \tanh(\alpha)$):

Figure 3. Projection of de Broglie Wave in the moving frame of reference.

Cosmological Coherence

The Hyperspherical Expanding Universe expands in units of de Broglie cycles. The figure 3 shows that a particle state of motion does not modify its phase relationship with the Universe. The particle is always phase matched to the rest of the Universe. This is the meaning of physical existence, this phase matching condition implies that all the Universe is in phase (lived the same number of de Broglie cycles) as it propagates along the dimensional time R . This also means that the Universe is thin along the radial direction of propagation (one de Broglie wavelength thin).

The number of de Broglie cycles a particle passes through is independent upon the angle α (relative velocity). This means that any particle of a given type is always in phase with another of the same type, irrespectively of its trajectory through the Universe. It also means that, say protons, created in the Dawn of the Universe kept the same phase relationship with all the other protons of the Universe throughout the ages. The same is true for any particle created at any time. De Broglie phase and intensity are properties shared by particle classes.

Figure 3 displays two inertial systems with the same origin. System with distinct origins would have an additional phase-shift due to the retarded potential interaction. This is the reason why all the waves in a multi-particle body can have their amplitudes added together, as opposed to having their amplitudes averaged out to zero due to a random phase relationship.

This coherence is essential in creating a Quantum Gravity Theory and it is essential to the HyperGeometrical Theory. In fact, Cosmological Coherence is a hypothesis and a corollary of the HyperGeometrical Theory.