What If ?

Abstract

Three short speculations are presented, questioning some fundamental assumptions of our enquiry of physics in relation to our attitudes to the physical world. They suggest that our attitudes affect our experience and understanding of reality.

What If #1

What if we regarded four dimensional reality as having three dimensions of ‘distribution’ and one of ‘frequency’ rather than (or as an additional alternative to) regarding it as having three dimensions of space and one of time? Where ‘distribution’ is the inverse of distance (i.e. 1/d) and frequency is the inverse of time (1/t).

We could do this without violating the dimensional integrity of space-time. Space-time and distribution-frequency would be physically equivalent, just inverse ways of seeing the same reality.

The perception of reality by observers having these two views is different. A distribution-frequency reality is perceived in terms of events (per unit distance or per unit time), while a space-time reality is perceived as a field in which events occur.

The distribution-frequency viewpoint also contains an implicit assumption of periodicity (and thus of motion), such that static events require an infinite sum of periodic functions for their description, whereas the space-time viewpoint contains an implicit assumption of static position and requires an infinite sum of linear functions to describe periodicity. From the distribution-frequency viewpoint, motion is the ‘rest’ state and stasis is a derivative state.

Viewing reality as a distribution-frequency requires engaging with it in a frequential (sic) mode rather than a spatial one. This means finding meaning in relationships between frequencies (as we do with colour in art and with tone and rhythm in music) rather than in relationships between positions (as we do in the measurement of distances or the duration of time).

A distribution-frequency interaction between events is a direct interference of their periodicities. A space-time interaction between events has background field separating the events and requires the mediation of causal forces to connect them. A distribution-frequency observation of events is a direct interaction between the events and the observer while a space-time observation of events is a mediated interaction between events and a separated observer. For humans, reality as a distribution-frequency is experienced as an ongoing frequential sensation while reality as a space-time is experienced as a series of encounters.

Debate over a quantisation of space-time must raise the possibility of a quantisation of frequency as well. Are there limits to the possible minute variations between frequencies? Is there a highest possible frequency? By what measure can we say that two frequencies are identical? That they never (infinite time?) go out of phase? By that standard there is absolutely zero difference between them, not a smallest quantum. By how long a resonance lasts? That would depend not only the difference in their frequencies but also on the absolute values of the frequencies. I am inclined to say that a quantisation of distribution-frequency is unlikely and a quantisation of space-time is possible, which is interesting given that they are merely inverses of each other.

What If #2

What if reality was curved in a way that it behaved differently at different scales? (I am not talking about the curvature of space-time.) For example, at our own spatial scale objects are able to interact purely geometrically, as keys fit locks and tiles fit into different patterns depending on their shapes. But such shape-based geometrical interaction is absent at scales smaller than the atomic – never are the geometrical shapes of sub-atomic particles considered to be relevant to their interactions. I also cannot think of any object much larger than planet Earth having a shape capable of participating in a geometric interaction. Geometrical interaction as a behaviour offered by reality appears to be confined to window of scale[i]. Depending where on the scale you look, reality behaves differently. Reality bends.

I like to imagine that we view reality from a spiral staircase rather than from a ladder of scale. As one travels up or down the staircase one looks out of differently angled windows. Each window offers a slightly different behavioural landscape, and the landscape from the top of the stairs may be very different to the landscape at the bottom. Each window has its horizons, and as one moves up or down the stairs, the horizons of one's landscape shift, and the behaviours available through one's window of reality change.

The staircase may well be infinite in extent. How small (or how temporally short) can small go? As we approach the Planck length or the big bang, reality may simply bend and offer different landscapes. Is there a maximum possible frequency? Not to my knowledge. Higher energies in a smaller universe imply higher frequencies, which could simply mean that many more events happen in smaller intervals of time. Reality could get smaller forever and the small observers wouldn't notice, though their horizons might shift. The Planck length is a horizon to the landscape of reality we see from here.

What If #3

The quantisation of events or materials appears to be connected to representing them as waves, and only permitting integral wavelengths of such representations to be capable of quantum interaction with other quantised events or materials. As interacting observers, we can only perceive quantising phenomena once they have achieved a full representational wavelength. Waves take time to develop, and it may take a while (a full cycle) before a representational wave can be perceived. To an observer (or other quantising phenomenon), these waves appear suddenly when they achieve full wavelengths, as if there had been no build-up, but there was only it could not be perceived. (And if the observer is itself a quantising phenomenon, then it too must have completed its full cycle before any interaction could take place as a quantum event rather than as an interference of waves.)

How long must a process be in train before it can be said to be a wave? One answer is to say that the shibboleth of a wave is its ability to resonate, and the minimum length of wave required for a resonance is a quarter wavelength (to give a node at one end and an anti-node at the other) or a half wavelength (with either nodes or antinodes at both ends). Perhaps it is only necessary for a quarter wavelength to have developed before a representational wave can be perceived.

What if electromagnetic waves that have not been in process for long enough to express a full (or quarter) wavelength, that are therefore not capable of quantising in interaction and therefore cannot be perceived, but are nonetheless capable of gravitational interaction (assuming gravity to be a wave rather than a quantum interaction), contribute to the enigma of dark matter?

In a universe with a finite age there must be a very large number of such unfinished waves and there always will be, especially close to sources of radiation.

Mike Abramowitz
August 2012

Notes:

[i] This is an interesting phenomenon in its own right. I have speculated on it in more detail (and in a much wider context) here: An Ontology of Relational Behaviour