Dynamical 3-Space: Observing Gravitational Wave Fluctuations and the Shnoll Effect using a Zener Diode Quantum Detector

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Shnoll has investigated the non-Poisson scatter of measurements in various phenomena such as biological and chemical reactions, radioactive decay, photodiode current leakage and germanium semiconductor noise, and attributed the scatter to cosmophysical factors. A more recent model of reality leads to a description of space which is dynamic and fractal and exhibits reverberation effects, and which offers an explanation for the scatter anomaly. This paper is a correction to the work presented earlier which used data from a RF coaxial cable experiment, but had insufficient timing resolution to show the full effects of what Shnoll observed. Here we report a different way to produce the effects through studying current fluctuations in reverse biased zener diode gravitational wave detector with better timing resolution. The current fluctuations have been shown to be caused by dynamical 3-space fluctuations/turbulence, namely gravitational waves.

1 Introduction — Shnoll effect

For over half a century Simon Shnoll has studied the non-Poisson scatter anomalies in various phenomena such as biological and chemical reactions, radioactive decay, photodiode current leakage and germanium semiconductor noise. An example of this is Fig. 1, which shows a layered histogram of some 352,980 successive measurements of the α decay rate of a ^{239}Pu source [1] undertaken by Shnoll between May 28 — June 01, 2004. The layer lines taken every 6000 successive measurements show a fine structure which builds up over time instead of cancelling out as in the case of a typical random or Poisson distribution. This suggests that the radioactivity of ^{239}Pu takes on discrete (preferred) values, and is not completely random. It should be clarified here that the effects Shnoll studied in depth were those concerning the shapes of histograms taken using fewer measurements (usually between 60 and 100) instead of that of the non-Poisson scatter of measurements taken over a much larger data set as discussed in our previous paper [2]. Shnoll found that the shapes of histograms from either the same or different experiments correlated via both absolute (same time) and local (time delay due to Earth's rotation) time synchronism and that the phenomenon causing this had a fractal nature. Shnoll attributed the cause of this to cosmophysical factors, i.e. inhomogeneities in the "space-time continuum" [1, 4]. These inhomogeneities are "caused by the movement of an object in the inhomogeneous gravitational field", e.g. as the Earth rotates/orbits the Sun, as the moon orbits the Earth etc. While these inhomogeneities were not characterised by Shnoll there is a remarkable amount of evidence supporting this conclusion [1]. An experiment which studied the phase difference of two RF signals traveling through two coaxial cables [5] was reported to show similar non-Poisson characteristics to that of ^{239}Pu decay shown in Fig. 1.

An alternative model of reality leads to a description of space which is dynamic and fractal. The RF coaxial cable propagation experiment can be used to characterise gravitational waves. However the resolution of the data in the coaxial cable experiment proved to be insufficient to study changes in histogram shapes. It is reported here that a newer technique which studies the non-Poisson characteristics of the current fluctuations in zener diodes and may be used to study gravitational waves. This technique allows for faster recording of data (every second instead of every 5 seconds) and used much higher digital resolution.

2 Dynamical 3-space

An alternative explanation of the Shnoll effect has been proposed using the dynamical 3-space theory; see *Process Physics* [6]. This arose from modeling time as a non-geometric process, i.e. keeping space and time as separate phenomena, and leads to a description of space which is dynamic and fractal. It uses a uniquely determined generalisation of Newtonian Gravity expressed in terms of a velocity field $\boldsymbol{v}(\boldsymbol{r}, t)$, defined relative to an observer at space label coordinate $\boldsymbol{r}$, rather than the original gravitational acceleration field. The dynamics of space in the absence of vorticity, $\nabla \times \boldsymbol{v} = \boldsymbol{0}$, becomes*

$$\nabla \cdot \left(\frac{\partial \boldsymbol{v}}{\partial t} + (\boldsymbol{v} \cdot \nabla) \boldsymbol{v} \right) + \frac{5\alpha}{4} \left((trD)^2 - tr(D^2) \right) + ... = -4\pi G \rho, \quad (1)$$

where $D_{ij} = \partial v_i / \partial x_j$, and $\rho = \rho(\boldsymbol{r}, t)$ is the usual matter density. The 1st term involves the Euler constituent acceleration, while the $\alpha-$term describes the self interaction of space. Laboratory, geophysical and astronomical data suggest that α is

*The α term in (1) has recently been changed due to a numerical error found in the analysis of borehole data. All solutions are also altered by these factors. (1) also contains higher order derivative terms — see [7] .

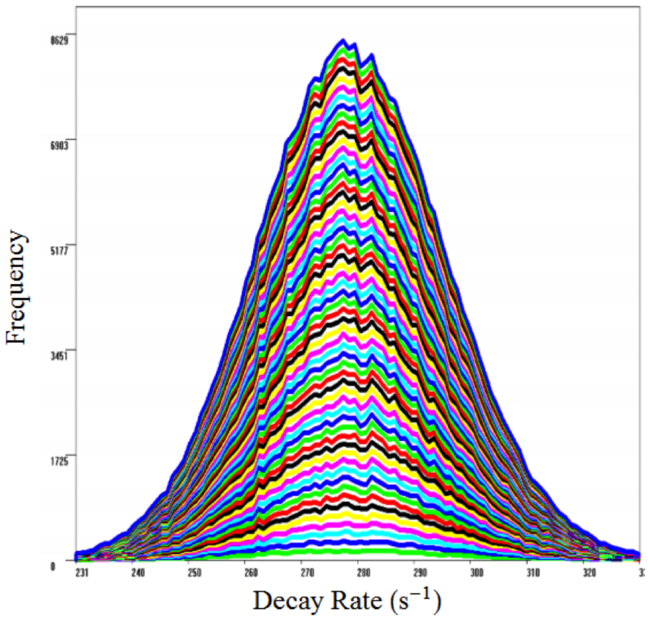

Fig. 1: Non-Poisson distribution of 352,980 measurements of ^{239}Pu α decay by Shnoll performed in 2004 (Fig. 2-2 of [1]). The layered histograms are taken every 6000 measurements. The x-axis denotes the number of decay events per second and the y-axis is the frequency of measurements.

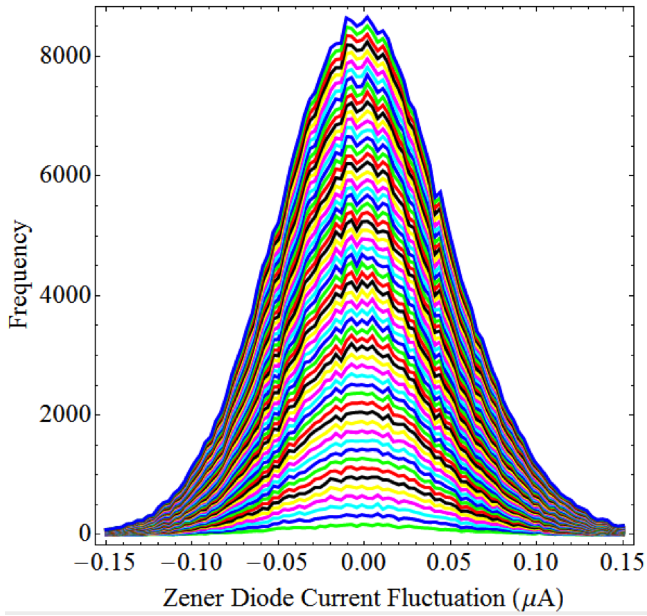

Fig. 2: Non-Poisson distribution of 376,101 measurements of zener diode current fluctuation (μA) observed from 20 — 27 Aug. 2013 in Adelaide. The layered histograms are taken every 6100 measurements to show a comparison with that of Fig.1.

the fine structure constant $\approx 1/137$. This velocity field corresponds to a space flow which has been detected in numerous experiments. In the spherically symmetric case and in the absence of matter $\rho = 0$, (1) contains solutions for black holes (spatial inflows) and an expanding universe (Hubble expansion) along with that for black holes embedded in an expanding universe [7]. Eqn.(1) also contains solutions for the inflow of space into a matter density. Perturbing the spatial inflow into matter (i.e. simulating gravitational waves) has shown to produce reverberations in which the wave generates trailing copies of itself [8]. This reverberation effect is caused by the non-linear nature of the flow dynamics evident in (1).

3 Zener diode quantum gravitational wave detector

A gravitational wave detector experiment performed in March 2012 measured the travel time difference of two 10MHz radio frequency (RF) signals propagating through dual coaxial cables [5]. This technique exploited the absence of the Fresnel drag effect in RF coaxial cables, at sufficiently low frequencies. This permitted the detection of gravitational waves at 1st order in v/c using one clock. The timing resolution of the results were however insufficient to study the effects Shnoll investigated, namely the changes in the histogram shapes over time.

A more recent experiment uses the current fluctuations in a reverse biased zener diode circuit. The circuit diagram is shown in Fig. 3. This detector exploits the discovery that the electron tunnelling current is not random, but caused by gravitational waves; namely fluctuations/turbulence in the passing dynamical 3-space [3]. A Fast Fourier Transform of the zener diode data was taken to remove low frequency artefacts, and then a histogram taken of the resultant 376,101 measurements (after inverse FFT) to generate the layered histogram plot shown in Fig. 2. Layer lines are inserted every 6100 measurements to show a comparison with the Shnoll plot in Fig. 1. Fig. 2 is remarkably comparable to Fig. 1, showng that the Shnoll effect is also present in zener diode experiments. The structure observed appears to build up over time instead of cancelling out and is also found to persist regardless of the time scale used for the phase difference, suggesting that the phenomenon causing this has a fractal nature as depicted in Fig.4. If this is indeed caused by a dynamical and fractal 3-space then the persisting structure observed in Figs. 1 and 2 correspond to regions of space passing the Earth that have preferred/discrete velocities, and not random ones, as randomly distributed velocities would result in a Poisson distribution, i.e. no features. A likely explanation for this is that the gravitational waves propagating in the 3-space inflow of the Earth or Sun could become phase locked due to the relative locations of massive objects [8]. This would cause reverberation effects, i.e. regions of space which have the same speed and direction, which then repeat over time. The reverberations would be detectable in many other experiments such as EM anisotropy, radiation decay, semiconductor noise generation etc. and could in the future be used to further characterise the dynamics of space.

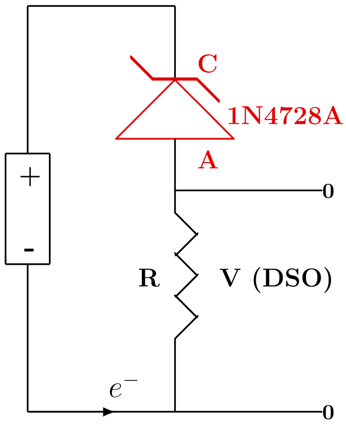

Fig. 3: Circuit of Zener Diode Quantum Gravitational Wave Detector, showing 1.5 AA battery, 1N4728A zener diode operating in reverse bias mode, and having a Zener voltage of 3.3 V, and resistor 10KΩ. Voltage V across resistor is measured and used to determine the space driven fluctuating tunneling current through the zener diode, [3]. Data is shown in Fig.2.

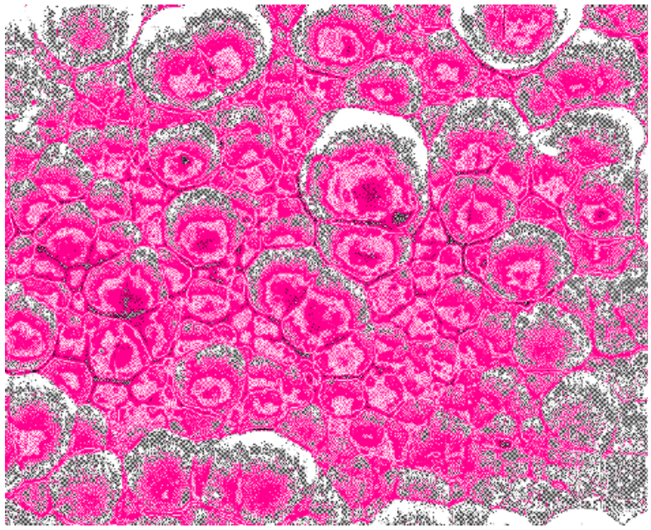

Fig. 4: Representation of the fractal wave data as revealing the fractal textured structure of the 3-space, with cells of space having slightly different velocities and continually changing, and moving wrt the earth with a speed of 500 km/s.

4 Conclusion

The data from a zener diode quantum gravitational wave experiment displays the non-Poisson characteristics Shnoll observed previously in radioactivity experiments. It is suggested that these two experiments (along with other work by Shnoll) are caused by the fractal nature of space, together with the reverberation effect from gravitational waves, as predicted by the Dynamical 3-Space theory.

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