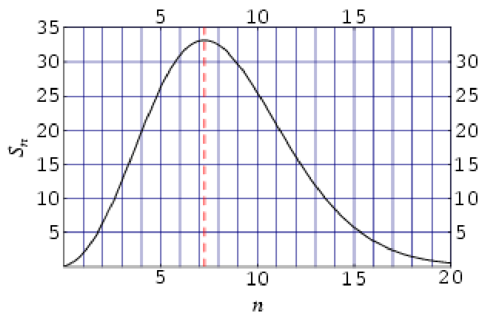
blaze labs research

The Particle - The wrong turn that led physics to a dead end

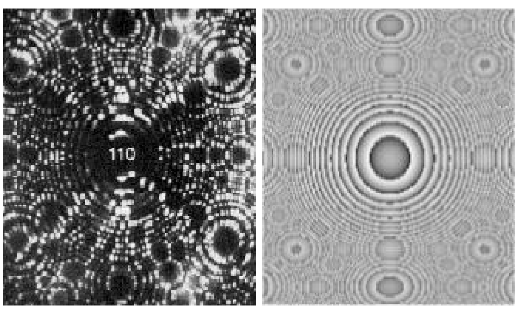
Unification into a fractal dimension

Conventional science fails to unify the two seperate backbones of the most recent scientific revolutions: relativity and quantum mechanics. All our past knowledge seems to assure us is that 'Nature is simpe', and this should answer our questions as to where these two important concepts come from and where do they unify into a simple singular concept. It seems that the answer is beyond any human's mind imagination or knowledge, but nature offers a lot of clues, which as I will show you, will eventually let us explain the connection between the macro universe scale and microphysics, and that enormous simplifications of current science is possible through such unified concept.

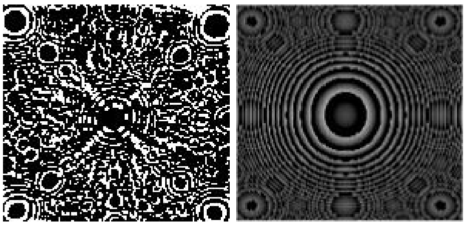
The observations discussed in the previous pages, show that although matter is made up of standing waves of real and imaginary waves, flowing forward and backward in time, everything boils down to a single unified dimension in which time needs no longer to be perceived. Remember that the perception of time is a requirement in order to observe any dimension higher than the observers' dimension. This means, that although science shows the existence of waves, and here we showed that particles are nothing but standing waves, when observed from the ultimate dimension, we see that the ingoing and outgoing waves, are not dynamic waves at all, and that 'ingoing' and 'outgoing' no longer apply in the unified dimension. We will find that the properties of space, and of waves behaviour are built into the SHAPE of the ultimate space dimension. But what makes the universe so rich in diversity? If the universe is just a hypersphere, then why are things around us not all spherical? The answer is partly staring at us in the following curve.



Apart from the fact that the ultimate dimension is approximately 7, we see that the peek of the curve does not occur at an integer value, in fact its maxima can only be approximated by iteration and occurs about 7.25695... which is very different from 7. The consequence of this is very important, as it results in a FRACTAL ULTIMATE DIMENSION. This means that the wave equations and properties can all be described in terms of a FRACTAL SHAPE, yes, it means that reflection, refraction, attenuation and all properties of standing waves (and of the universe) can be described by a complex fractal shape in the 7.25695th dimension. It also means that all things surrounding us, as are solids, liquids, air, plasma, living objects and planets, all obey their underlying fractal equations which are embedded into the hyperdimensional fractal of which they form part. Self-similar replication and harmonic resonance are natural features of fractal structures and organizations. We can finally see how the quantum and macro world can be easily unified. Quit mind boggling, but let us see the clear evidence in nature.



Tungsten needle tip photo ---> Mathematical iteration $z_{n+1} = z_n^2$ modulus n

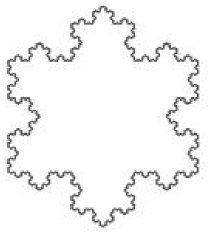


Platinum needle tip photo ---> Mathematical iteration $z_{n+1} = z_n^2$ modulus n

The above two photos on top and bottom left are actual field ion microscope images of single crystal tips of Tungsten and Platinum respectively. The two adjacent plots have been mathematically computed and plotted by the same fractal function based on the iteration $z_{n+1} = z_n^2$ modulus n.

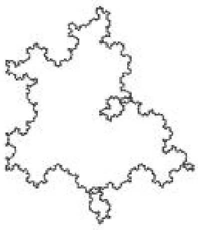
The plots have been only adjusted in brightness to make the similarity more obvious, but otherwise are the same. This is fantastic, as it means that the pattern formed by 3D standing waves obey an underlying iterative function. Using just a simple iterative function, we do not even need to have any knowledge of inwaves, outwaves and wave properties such as reflection. This solves the enigma of which wave (incoming or outgoing) came first. In fact it explains how neither of them comes first, and although we perceive the standing wave as a resultant of an incoming and an outgoing wave, both waves are generated at the same time. This also explains why a wave seems to know its destination before reaching it... both the positive time going wave and negative time going wave form part of an underlying static fractal hyper structure.

In 1904, Swedish mathematician Helge von Koch defined a continuous curve that could not be differentiated. It was just another example of a discovery first made some years before by Karl Weierstrass, but it has lead to more general constructions.



Koch Snowflake fractal

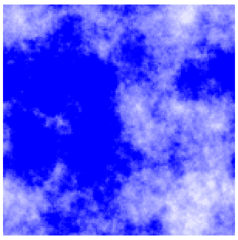
Instead of using the same rule on every step, an element of chance can be introduced by allowing to switch to the opposite orientation. This simple effect leads to more irregular outlines resembling natural coastlines. However, the fractal dimensions of both figures remain the same: approximately 1.262. At first glance one does not notice that a coastline is in fact a fractal. Given a map one can sit down with a ruler and soon come up with a value for the length. The problem is that repeating the operation with a larger scale map yields a greater estimate of the length. If we actually went to the coast and measured them directly, then still greater estimates would result. It turns out that as the scale of measurement decreases the estimated length increases without limit. Thus, if the scale of the (hypothetical) measurements were to be infinitely small, then the estimated length would become infinitely large! Lewis Fry Richardson (quoted in Mandelbrot, 1983) noted this dependence of measured length to the measuring scale used.



Fractal Coastline

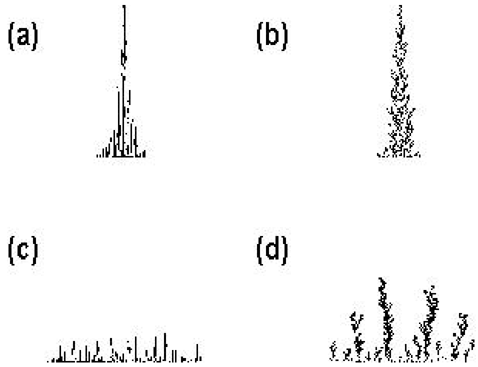
Fractals have one special property, self-similarity, which makes them independent of scale. In other words, if you zoom-in on a fractal or magnify a section to view it, it will appear as if you were looking at the original object. A great example of the self-similarity property that can be found in nature is that of the fern. If you examined one of the fronds of a fern, you would see that the frond actually looks like a smaller fern itself. Most fractals in nature however are not as perfectly self-similar as the fern is. Take a cloud for example. If we zoom in on a section of a cloud, cut it out and looked at it from far away, it wouldn't look exactly like the original cloud but would still look like a cloud nonetheless. The importance of the self-similarity property of fractals is therefore not that the magnified portion of the original object looks exactly the same, but that it LOOKS SIMILAR. The intricate patterns embedded in fractals due to the self-similarity property are what make fractals so impressive to the eye. Most impressive is when we find a fractal in nature that is perfectly self-similar like the fern. One sort of fractal is known as the Iterated Function System, or IFS. This fractal system was first explored by Michael Barnsley at the Georgia Institute of Technology in the 1980s. You start with shapes plotted on a graph, and iterate the shapes through a calculation process that transforms them into other shapes on the graph. Starting with four shapes, one of which is squashed into a line segment (this becomes the fern's rachis or stalk), you apply the shapes to the calculation to generate more shapes, feed them back into the calculation process, etc. Eventually a pattern emerges that bears a startling resemblance to a fern, if you choose the right starting shapes and positions. The longer you continue the iteration process, the more intricate the tiny detail in the pattern becomes.

Barnsley's Fern generated by IFS fractal system



Cloud fractal dimension 2.5

Brownian Motion is an example of a process that has a fractal dimension of 2. It occurs in microscopic particles and is the result of random jostling by water molecules (if water is the medium). The path of such a particle is a "random walk" in which both direction and distance are uniformly distributed random variables. So in moving from a given location in space to any other, the path taken by the particle is almost certain to fill the whole space before it reaches the exact point that is the 'destination'. Again, for a time dependent observer, it would seem as if each and every particle has got the knowledge of the path taken of all other particles, very similar indeed to the enigmatic EPR experiment! Another aspect of brownian motion is its effect on the formation of aggregates such as crystals. The figure below shows structures formed under different assumptions about the relative rate of horizontal movement (h) and the probability (p) of a settling particle sticking to fized particles as it brushes past. In the figure the following values are shown: (a) h=1, p=0; (b) h=1, p=1; (c) h=10, p=0; (d) h=10, p=1.

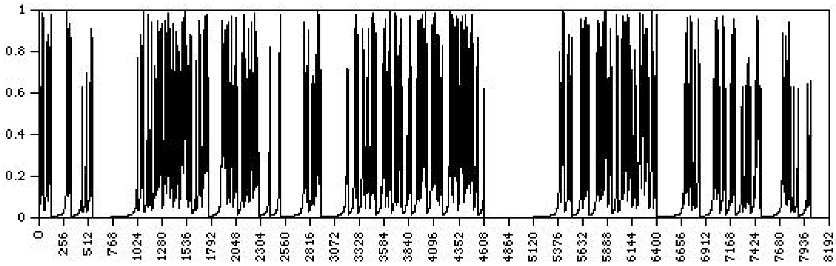


Brownian 'random' motion predicted by fractal function

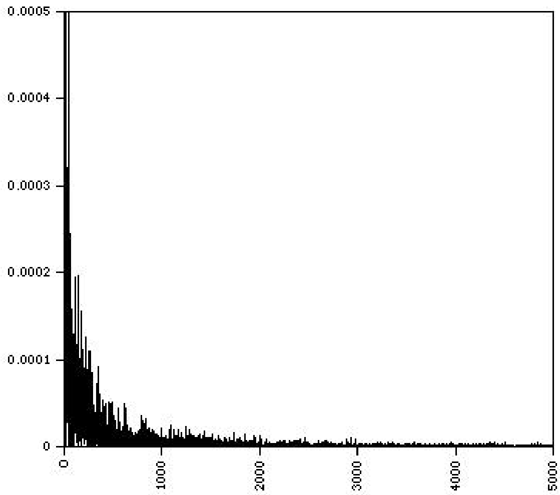
The most common random signal found in nature is called the 1/f noise. You can find electronic circuits which let you amplify and hear this naturally generated background noise. One may think that since nature generates a random signal, then there are some exceptions to the well regulated fractal concept as depicted here. But, no, this is no exception, 1/f noise is not chaotic as it looks like, and is just obeying its higher order fractal function. 1/f noise can in fact be created using deterministic functions. One such method is a finite difference equation proposed by I. Procaccia and H. Schuster. It is simply

$$x_t = (x_{t-1} + x_{t-1}^2) \bmod 1$$

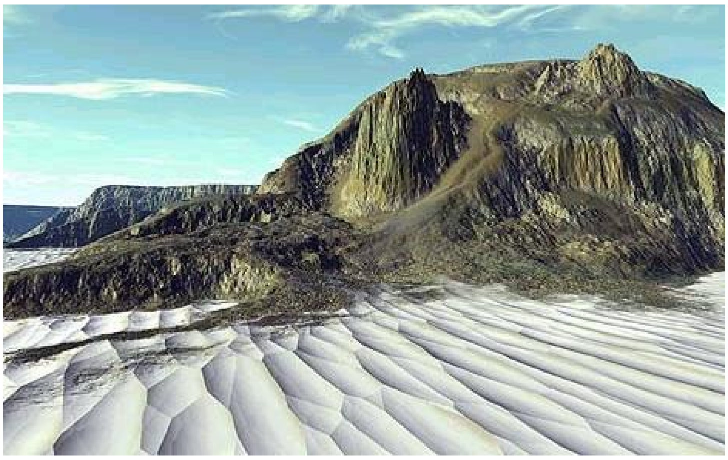
A section of the time series is illustrated below.



The power spectra is shown below.

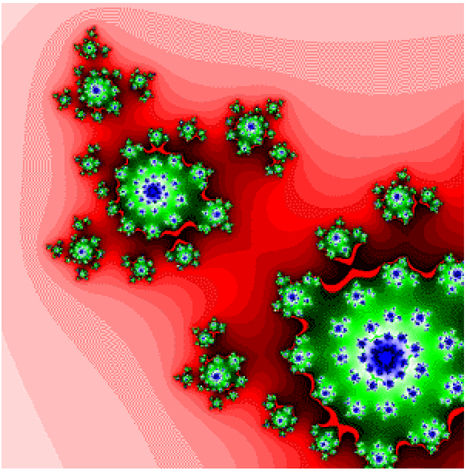


We are living in a period of such absurdly blind acceptance of the Cartesian co-ordinate system that we think of all things around us as made up of primitives such as lines, rectangles, polygons, and curves in 2 D or boxes and surfaces in 3D. One of the first lessons present children learn at their primary schools is to build up shapes of various things with such cartesian building blocks. Its not surprising to note that few of them, if any, will be able to build any natural occuring structure in this way, and a high percentage of the students will only be able to replicate other man-made structures as houses, robots, ships, etc.. Even commonly used computer graphic softwares are based on cartesian co-ordinates, and this explains why it is so difficult for anybody to draw for example a fern leave, or landscape or a simple insect with the cartesian based CADs. We often find that these geometric primitives and usual tools for manipulating them, typically prove inadequate when it comes to representing most objects found in nature such as clouds, plants, crystals, waves, or a simple piece of stone. Now we know the reason behind, simply because the universe is unified in a fractal dimension and not in two or three dimensions. Note that when I mention the universe, I am not refering to the stars and galaxies, but to everything from subquantum scale to the macroscale that exists. There has been considerable interest recently in chaos theory and fractal geometry as we find that many processes in the world can be accurately described using that theory. In fact the computer graphics industry is rapidly incorporating these techniques in dedicated graphic rendering CADs to generate stunningly beautiful images as well as realistic natural looking structures.



Fractal computer-generated landscape

At this point, you should realize how the macro and quantum worlds are easily unified when one considers the fact that the universe we live in, and of which we are part of, exists in a fractal hyperdimension. All things we observe are just a small piece of this immense fractal function projected onto our 3D observation plane. When a fractal function 'separates' from another it is observed as a seperate entity (in 3D), but actually each one of them still forms part of one unified function in higher dimension.



Fractal generating 'seperate' entities

Human body computer generated fractal?? See next page...

< prev home next >