

Is Qi the same as Energy?

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This article is a review of the current scientific research into the way the body is holistically organised. Much of this research has been used to explain or validate the oriental concept of Qi (Ki in Japanese), which is almost always translated as Energy. I will argue that they are not the same concept but that it is still possible that the research can throw light on the nature of Qi and provide a way for Western Health Professionals to understand and respect Oriental Therapies.

Chinese dictionaries define Qi with a spectrum of concepts ranging through: air, spirit, mind, heart, will, intention, disposition and attention, but energy is not a common reading. So why do we translate it as such? The Chinese character for Qi, pictured above, represents 'the steam given off by cooking rice'. It connotes something (the 'riceness') that is retained when a substance is transformed from material to non-material form.

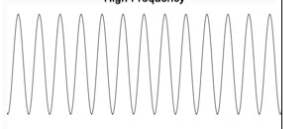




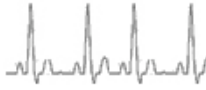

As Patrizia Stefanini [S3] points out, this is also true of the western concept of energy. She illustrates this in its most dramatic form with Einstein's famous $E = mc^2$, which says that energy (E) and mass (m) are two facets of the same reality. However, this conservation does not define the western concept of energy, other properties of a system are also conserved when it transforms. The most succinct way of defining the energy of an object is as "a measure of its ability to change its own motion, or the motion of another object"[Q13]. It is therefore the potential for change.

This idea of 'potential for change' is shared with the Oriental idea of Qi, and also the property of 'manifestation in different modes of existence'. Both Qi and Energy denote something which is conserved in the transformation from potential to movement, from material to non-material, from rice to steam. But are they the same concept? I don't think so, and I will try to explain why.

The Quantum Wave Explanation

The intuitive picture that seems to be prevalent in the Shiatsu community is that Qi is a form of energy like an electromagnetic wave. We talk of Qi flowing as if it were something like electricity in a wire. Several people have proposed that the different modes in which Qi manifests are linked to the different quantum energy states of this wave, which are defined by different frequencies. Pauline Sasaki and Clifford Andrews [S2] developed a system that they call Quantum Shiatsu, which explicitly links different levels of existence to the 'frequency of the Qi'. These are described as: "the physical level, characterized by low frequency and high density, the emotional level, the mental and the spiritual, characterized by high frequency" [S4]. This spectrum of levels is the same that Theosophists espoused in the late 19th century, deriving from the ideas of Chakras in Vedantic Yoga. It has become a common currency in 'energetic-therapy' and it fits our intuitive experience: the body changes slowly, emotions change faster and the mind flits around like lightning. So this ordering of vibration is a useful description of the quality of Qi at different levels of existence.

I can buy that. It seems to be true about Qi. But it is not consistent with quantum physics' view of Energy. In fact, it is exactly the opposite! Quantum entities are described as combinations of waves, and the energy of a wave is proportional to its frequency. Now, the more massive an object, the more energy it has (because Einstein showed that mass is a form of energy) so the higher the frequency of its quantum state. Therefore, for quantum energy, the material level is high-frequency while low frequencies can only be reached by the purely energetic. Although both Qi and Energy may manifest in different realms according to the 'frequency of vibration', they do so differently and therefore are different concepts.

CHAKRAS & Qi		QUANTUM ENERGY	
Mind, Spirit, Pure Energy	High Frequency 	Massive, material particles	Alpha waves in Brain 8-13 beats a second Appear in meditation. Highly conscious 
Emotions		Light Particles, High energy light	Delta waves in Brain 1-4 beats a second Sleep and infancy. Low consciousness 
Body, Material Existence	Low Frequency 	Pure Energy	Heart Beat - 60-180 beats a minute Indicator of excitement/ emotion 
			Breathing Rhythm - 4-15 beats a minute Correlates with rhythm of non-vascular fluids 
Comparison of how ideas of Qi and Quantum Energy classify 'materiality' by frequency.			Possibly, the intuition we have about Qi frequencies is derived from the different rhythms in the body.

‘Qi’ is more complex than ‘Energy’

The above observation is not in any way meant to undermine Quantum Shiatsu. The wave concept of a spectrum of frequencies in superposition is a useful and practical way of thinking about how Qi manifests in different aspects of a human being simultaneously. But, if we identify Qi with Energy, then we start thinking about it as purely a quantum wave or as a level of excitation, while the oriental concept of Qi is much more sophisticated.

For instance, when we talk about Stomach Qi, we are talking about a process which actively meets the needs of the organism. In another example, Gall Bladder Qi is the process of corralling conflicting impulses into collaboration, thus ‘making a decision’. In other words, the Organ Qi is a *potential for organised action*, which manifests in different ways in the different levels of experience but always with a recognisable theme. For instance, Stomach Qi manifests in the physiology as the activity of getting and digesting food, it manifests in movement as the activity of using the ground for support, it manifests in the emotions as the activity of reaching out to others and accepting their help. In all these cases, the organising theme is ‘Getting the Support of the Outside World’. In short, western energy is a potential for simple movement, Qi is a higher order concept, which expresses the potential for the coordinated action of many different parts.

So, if we could provide a mechanism for this ordering function of Qi at different levels of the organism, then we could really explain to people how oriental therapies work. On the other hand, if we sloppily translate the word as ‘Energy’ then we lose this explanatory power because the classical western concept does not have the depth or breadth contained in the word Qi.

The Quantum Coherence Explanation

One attempt to explain this non-simplistic ‘ordering’ property of Qi in terms of quantum physics comes from Emilio del Giudice [Q2] who suggests that the harmonisation of the organism generated by meridian work is produced through a phenomenon called Quantum Coherence.

Quantum Coherence is a state of connection between quantum entities called bosons so that they are all ‘in phase’; profoundly connected in a state called entanglement. This means that all the entangled particles act as one entity and therefore create a focus for holistic ordering rather like a strong choir leading the singing in church. However, material particles need a very low temperature (hugely below freezing) to condense in this way and light (which doesn’t need low temperatures) escapes so fast that it does not seem likely that it could be an organising factor in the body. So, at first glance, coherence does not seem to be a possible mechanism for the ordering function of Qi because the body is too hot. However, Del Giudice, along with his colleagues Giuliano Preparata and Giuseppe Vitiello [Q1] showed how coherence might be maintained in biological organisms through a strange type of photon mode, which they showed theoretically could be generated by water in a background electromagnetic field.

The fact that water was the magic substance that made coherence theoretically possible in the body encouraged several people to believe that this could be the means by which the organism as a whole was integrated. Fritz-Albert Popp [Q11, Q12] and others propose that meridians are zones of maximal coherence which can be detected by what he calls ‘biophotons’. These are very weak infrared light given off by living organisms. Biophotons are well documented, but other physicists outside his ‘group’ who have studied Popp’s proposal can find no real evidence that coherent fields are their source. Intriguingly, Popp has produced pictures of the body in which meridians seem to have different biophoton temperature than surrounding tissues, so the jury is still out.



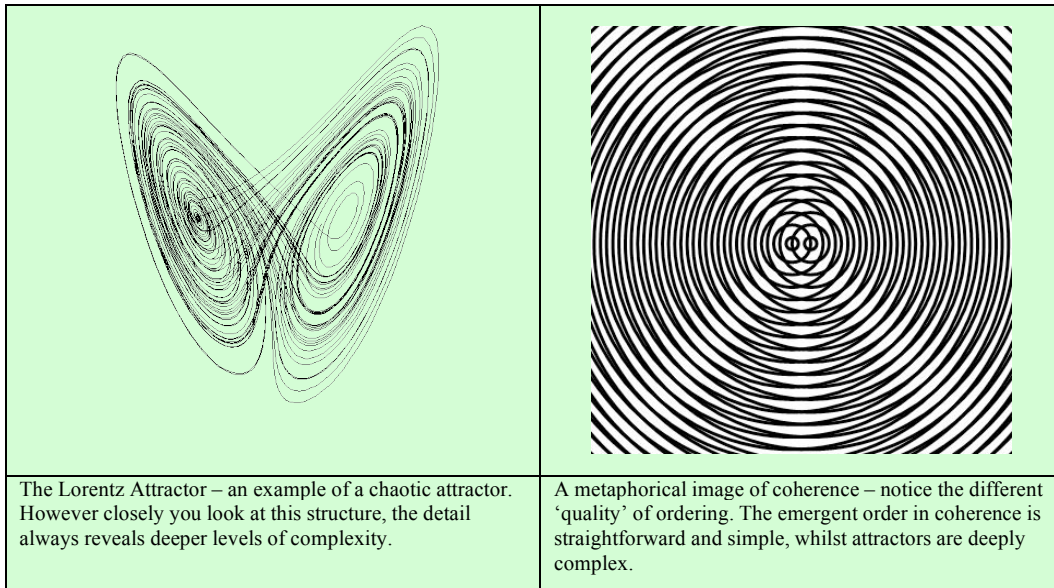
One of Schlebusch and Popp’s pictures of biophoton emission, which they claim trace the Bladder meridian. They have also made similar pictures of the Stomach meridian. However, their theory that the biophotons are given off by quantum coherent fields is disputed and there are other possible explanations for such localised emissions, for instance that meridians are paths of low electrical resistance in the body. Although Popp’s pictures may show meridians, there is no clear evidence for coherence nor that the biophotons are related to any organising functions of meridians.

The Chaotic Attractor Explanation

On the other hand, there is a rival explanation of the organism's holistic ordering derived from complexity theory. Dirk Helbing, a physicist at the Swiss Federal Institute of Technology, does research into systems that are complex enough to sense their environment and which have the ability to adjust themselves according to the feedback [C3,4]. This obviously encompasses living organisms but also includes urban traffic control networks! Several authors have pointed out that Qi could be explained as a general feature of these so called 'non-linear' feedback systems. [C11]. Helbing proves that such systems will organise themselves automatically and very efficiently if they are given sensory feedback and also some elementary rules for adapting, which may simply come from the success or failure of past responses; in other words a memory [C2].

Such organisation cannot be described as a set of rules, it is dynamic and unpredictable but is nevertheless highly ordered. Mathematicians call these forms of organisation 'chaotic attractors', which are patterns in the so called 'phase space' of the system. Phase space is a mathematical way of looking at how a system develops holistically (which makes it a good candidate for talking about Oriental Medicine); to give an illustrative example, circles in phase space describe the system repeating its behaviour again and again, because a circle is a path that repeats itself.

Chaotic attractors are more like spirals - they never quite repeat, but they stay within certain limits - so they describe an holistic state whose development is built on past experience and that doesn't go off on wild jags. Therefore, you could say that a system which is following an attractor develops progressively without getting stuck in habits. A good definition of health!



It has been clearly demonstrated that the brain uses chaotic attractors to learn and recognise sensory data. [C5]. Michael Hyland [C9] suggests that the whole body is intelligently organised by learning to follow attractors and that the process of Qi therapy can be explained as helping the organism as a whole to lock into their trajectories. If this language is confusing, the key thing to remember is that Helbing has showed that a system will lock into an attractor (and thus develop in an organised way) if it is given clear feedback and has some simple memory of past learning by which to judge its choices.

My research [S5,6] shows that babies develop physical skills through movements which evolve along the Chinese meridians. This suggests that meridians are the paths along which the body learns to organise itself, and so could link to a body-memory of coordinated action. **So touch on meridians could supply both the feedback and the memory necessary to shift the body into one of Helbing's attractors.** I find this explanation of Qi-therapy satisfying, and it provides a mechanism for Hyland's basic idea of a therapy pulling a system into phase with a healthy attractor, but I am wary of this tendency to believe it. We are always drawn to theories which validate our particular viewpoint and research!

On the other hand, I am interested why the alternative medicine community is so attracted to the quantum explanations. Maybe they want to feel that the magic of the therapy is enhanced by the mystery evoked by the quantum concepts, while the explanations based on complexity theory do not create the same sense of wonder.

Summary

Qi and Energy are similar in that they express the potential for change but they are not the same concept because they are different in detail. In addition Qi is a more sophisticated concept than Energy because it can express the potential for organised change.

There are two main attempts to understand the organising function of Qi in terms of Western science. The first argues that Qi is a state of quantum coherence in the body's electromagnetic fields, the second explanation comes from complexity theory, and suggests that Qi is an organising principle which emerges naturally and inevitably from the development of complex feedback systems like living organisms. In this second approach, Qi can be seen as a chaotic attractor.

Quantum Coherence would order the body like a choir leading the singing in church, providing a model of togetherness. Chaotic Attractors do not order the system by doing anything, they are the natural and inevitable paths along which an organism develops progressively. However, once the organism locks into a chaotic attractor, its natural tendency is to stay on that path, so the attractor gives the impression of pulling the system into an ordered state.

It may be helpful to compare the two explanations with the ancient Taoist description of Qi:

Taoist Qi	Chaotic Attractors	Quantum Coherence
Qi is generated from binary simplicity (the interaction of Yin and Yang)	Generated from two simple ingredients: action and feedback.	Generated from simplicity and forces everything to be simple.
From the Universal Qi come multiple levels of more detailed functional Qi, stepping down towards the complexity of earthly reality.	Chaotic Attractors are fractals , which means they can be viewed at any level of magnification and reveal more complexity. A beautiful video of different levels of a fractal can be seen on http://uk.youtube.com/watch?v=G_GBwuYuOOs	Does not, in itself, generate any complexity. At all levels of magnification Quantum Coherence is simple.
Qi expresses itself self-similarly at different levels of life. For instance, Stomach Qi's theme of 'Getting support from the outer world' can be perceived at different levels of the organism's existence.	Fractals are 'self-similar' at all scales. As you zoom into them you keep seeing the same theme repeating within the complexity. A video of a fractal showing the self-similarity at different levels is at http://uk.youtube.com/watch?v=cN1N8jObk4w Because this video is of a fern, it shows an example of life using fractal strategies to build organized complexity.	Quantum Coherence has a trivial type of self-similarity: every part is in phase and is the same. It has sameness rather than similarity at higher levels of magnification but this sameness seems too simple to contain higher-order themes.
Qi is an ingredient of Life – it expresses the potential for adaption and development	Chaotic Attractors trace the evolution of a changing and developing system, which has the potential to adapt to new situations without losing its organisation. More than any other mathematical concept, they have enough depth, complexity and stability to encompass the development and evolution of life.	Quantum Coherence provides a focal zone of harmony which is like a choir leading the singing. But it is very sensitive to disturbance and easily breaks down. It has no concept of 'development'

I cannot hide the fact that I favour the Chaotic Attractor explanation, but this should not be a matter of belief. There are several experiments [S0] which would rule out one of the above theories and I hope these will be performed in the near future. However, whichever theory turns out to be closer to reality, I feel that the research and philosophy we have been reviewing reveals Qi to be a more sophisticated concept than we normally use when we talk about Qi-therapies. We often use the word 'Energy', which scientific minded people will dismiss as misguided or mystical. If, instead, we talk about Qi as something like 'holistic organising principles' then I feel we are closer to both scientific reality and the Taoist classics, and are talking about something that doctors and scientists know to exist and can respect.

References

There are so many references that contributed to this article that we have put them on the web at www.seed.org/publications/qi_research_references.html. However, the major ones referred to in this review are listed below.

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