



## Heat, quantum mechanics and information

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### ABSTRACT

Heat has often been described as part of the energy transfer process. Information theory says everything is information. If everything is information then what type of information is heat, this question can be settled by the double slit experiment, but we must know what we are looking for.

### Indexing terms/Keywords

Heat; information; double slit experiment; quantum mechanics; wave theory; particle theory; information isolation; information independence; heat isolation; tshison; heat particle

### Academic Discipline And Sub-Disciplines

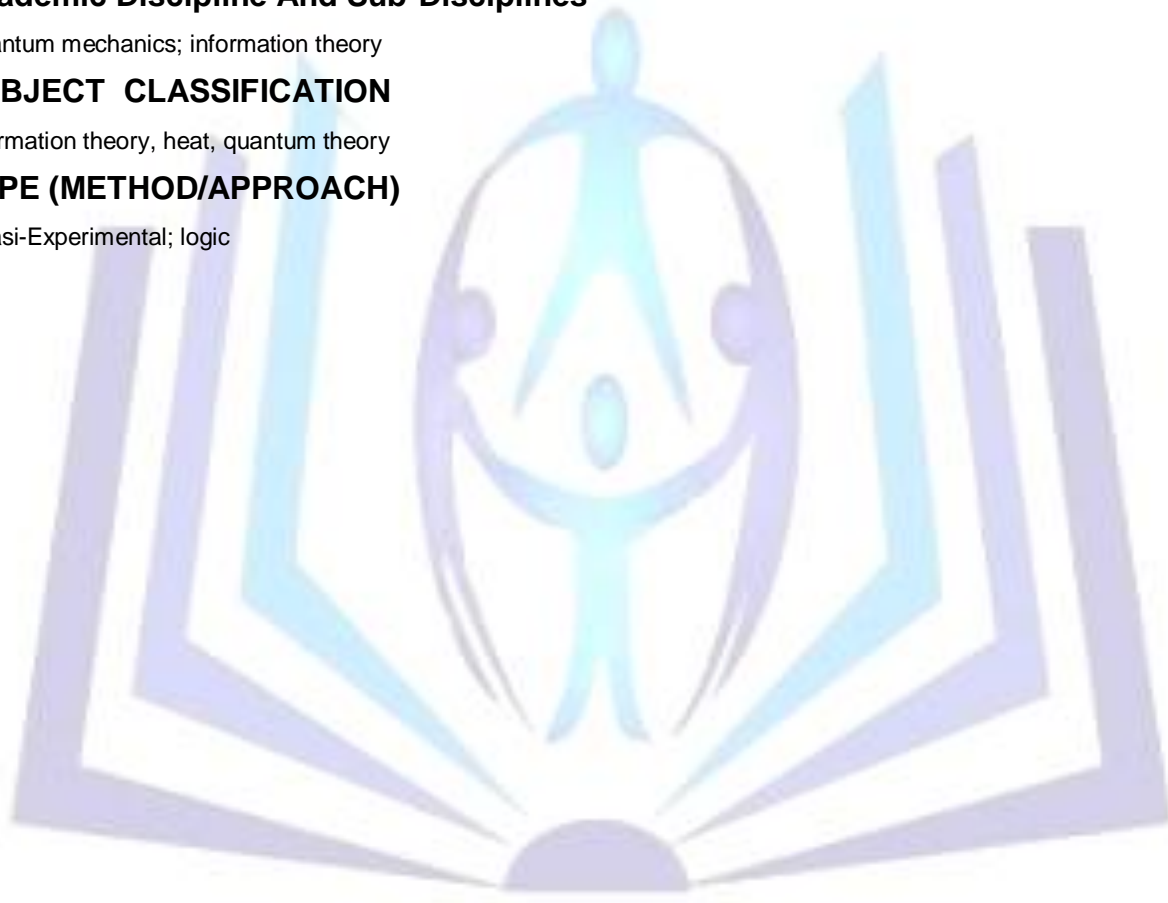
Quantum mechanics; information theory

### SUBJECT CLASSIFICATION

Information theory, heat, quantum theory

### TYPE (METHOD/APPROACH)

Quasi-Experimental; logic



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## INTRODUCTION

We start from the fact that everything is information. If one does not understand what information is it would be wise to watch a video entitled “Physics of Information – Quantum Entanglement, Black Holes and Holographic Universe.” The video features Leonard Susskind, Anthony Leggett, Seth Lloyd, and Christopher Fuchs debating about information, starting off with excellent definitions of information except for Christopher Fuchs who confuses knowledge and information.

We can call stuff, information packages. The earth is an information package, an atom is information package both representing different aspects of information density and complexity. Information density being amount of information, and complexity being variation of that information.

Light is a package of information that we call photons, and itself is a result of interaction between information packages. Everything, every action in the universe can be summed up as the result of interactions between information packages, light, heat, electricity, gravity, all the result of interaction between information packages.

Anthony Leggett in the above mentioned video talks of information having to be embodied. If everything is information, heat must be information, can we treat it as if it was a quantum phenomenon, is it embodied, if not, then no less than a Nobel Laureate is wrong about information.

Heat is energy transfer that is wrongly thought of as wasted energy because seemingly no work is done. In this manner heat can be considered wasted effort, the proper technical term if heat is the result of no work being accomplished. Can heat truly be considered wasted effort, without this wasted effort could humanity even exist to describe heat as the result of energy that does no work.

If everything is information, it means that everything can be isolated because its existence would be independent of other information packages. This is important, if information packages did not have the quality of independence we would not be able to learn anything as we could not isolate the information and understand it. Humans would have to know everything or nothing.

Heat like most phenomenon we have encountered can be measured. We have decided to call this measurement temperature and we use the kelvin as the unit to measure this temperature, a better unit thus far than the previous units as it starts at zero and we have no negative, temperature is a quantity, how can a quantity be negative. Heat is a phenomenon that humans are very sensitive to, it would be of scientific interest to see how it behaves in a quantum manner. Why not put heat to the double slit experiment? We must first attempt to isolate the heat.

## Heat and double slit experiment

### Heat and the double slit experiment

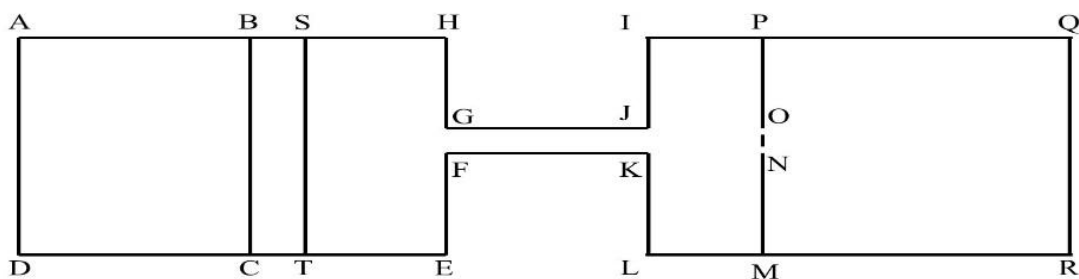


Figure 1

Figure 1 above illustrates an experiment that can be carried out to the best of our abilities with the knowledge that we possess as mankind at the present moment of the writing of this paper. ABCD is a blackbody like a kiln allowed to get as hot as possible. BH, CE, HG, EF are made from heat resistant material. BHEC form a chamber. A tunnel is created GJKF, this too is made of heat resistant material. There is another chamber IPML also made from heat resistant material, this chamber has 2 slits between ON. At QR we have a screen to measure it is heat sensitive material. PQ and MR are also heat resistant material.

The idea of the experiment is that we heat up the kiln, ABCD at is on to as high a temperature as possible. We then have a partition, ST, made up of the same material as the kiln, this is further to absorb light as we just want heat passing through the tunnel GJKF. This heat is directed towards the double slits that separate PM, the double slits are between PO, and MN. Putting an observer at either O or N we can observe actions of a wave, since heat is taken as a wave of radiation. As it is dark in hear the observer will be aided by infrared equipment. We should be able to observe the wave creation to the left of partition PM. And observe the wave at QR.

These are not ideal conditions but the best we can try, ideally the conditions in PQRM would be at 0o Kelvins as well as IQRL being a vacuum and then would be able to measure/ observe the slightest changes at QR, and changes would be quicker, but after this thought experiment we might even decide that there are more suitable measures of temperature.

If indeed heat is a wave then we can explore wave formation and what actually waves are doing.

First and most important we can learn the properties of the wave because we are measuring temperatures at QR. Are the temperatures of the wave uniform? If this is the case then there is no more. If however temperatures that are measured



vary then the wave sorts itself out according to properties of waves, this we should have easily guessed because of how we see the light wave behave. It splits into predictable colors, the heat wave can also be divided into wave lengths. This should be no surprise, there is hardly any uniformity in the 3rd dimension, why should we expect uniformity of phenomenon at the atomic level. This was explained in the paper "Information theory and dimensions: Enhancing Quantum Mechanics" when discussing the phenomenon of quantum tunnelling. A wave should not be a uniform structure, there would be no variety in the universe.

It can be argued that quantum tunnelling is a result of differences in information packages rather than a particle or wave borrowing energy from the future. Each wave or particle is a unique phenomenon, particles are not uniform, hence why some particles will pass a barrier or not. This can be put to experimentation, there will be a size of barrier that all particles will pass. Quantum tunnelling is related to size of barrier, the smaller the barrier the more particles will pass, and meaning there is different sizes of particles. An experiment can be done with graphene as a barrier, because graphene can be one atom thick.

### **If Heat is more than a wave**

If through experimentation that when we happen to observe at N and O and we find that we have a pattern of a particle then we not only hopefully confirm Leggett's assertion that information needs to be embodied, we would also agree that information is everything, and information is particles, and everything including heat can be used to compute as Seth Lloyd seemed to assert in the above mentioned video.

Heat as a particle changes our understanding of heat. It would have to be massless. It would mean massless particles have a particular role to play as regulators. A system likes to remain stable, massless particles give balance and can be released to regulate amount of energy in a system. Light and heat are released as a way to maintain balance in a system. If too much heat is introduced and not enough released for example, the system changes form, from solid to liquid to gas, it is attempting to maintain itself. Too much heat of course system destroyed and new elements created.

If heat is introduced to a system as energy, the system trying to maintain itself releases heat. Temperature therefore is a type of weight, it measures quantity of heat particles, if and only if through experimentation and we observe at point N or O and heat behaves like a particle. It means at 0 kelvin there is no introduction of heat particle. Heat behaving like a particle means that the best expression of a kelvin would be how many heat particles per x number of particles.

If indeed we find that heat has behaved like a particle when observed it means a lot more phenomenon can be explained by particles it is just our lack of instrumentation. Heat behaving like a particle would mean electricity is particles, obviously much smaller than electrons, electricity would be released to balance a system as energy is introduced into a system, all forces will then be able to logically be explained as particles, resulting in a system attempting to balance itself as best as it can.

A good name for this now hypothetical heat particle should be a tshison, a break from Latin and Greek naming, science belongs to humanity.

### **Conclusion**

This experiment will allow us to confirm that heat is a wave and to study that wave, understanding the heat spectrum so to say. The experiment could also go in an unexpected direction and we find particle behaviour, then information can be logically be confirmed to be of similar type, it is a particle, and everything is information and indeed it is embodied. Not only is it embodied, it can be isolated.

This experiment will more or less complete knowledge theory concerning the material, that is knowledge economics. Quantum physics is logical conclusion of knowledge theory as it is the foundation of the material information that is exploited by humans to create products.

### **ACKNOWLEDGMENTS**

All humans who have fought for the right of the individual and liberty, this paper is dedicated to them. All those who have contributed to a society whereby all can use their talents, the knowledge they possess throughout history, they must be acknowledged. They contributed more than just right for scientific work, but for artists to be artists, thinkers to be thinkers and contribute, more liberty will mean greater advancement for humanity.

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### **Author' biography with Photo**



Bhkuzulu Khumalo is a specialist in dealing with information and knowledge.