

How to Expand Phase Space- A short description of my ideas to use magnetic monopoles to expand the Phase Space/Entropy of a system.

Assumptions:

- Monopoles are everywhere and define the total possible Entropy in a system
- A superconductive state is the state of complete inertia, e.g. its momentum is 0, thus its kinetic energy as well as temperature is 0. Furthermore, if one wants a physical, empirical definition of a vacuum, a superconductor should be used as that definition.

A power, theoretical assumption about magnetic monopoles that has not been explored is that ALL of the spontaneous joule heating that is observed from superconductors and is a necessary physical process in order to have superconductors function in compliance with the Second Law is due to magnetic monopole interactions.

Let us Assume we can model the dynamics of a system with some matrix  $W$ , with momentum  $P$ , and total energy  $E$ . Given the observation that superconductive states can be triggered through extreme cooling or extreme pressure, we shall model and name the process of turning a material into a superconductive as  $C$  and call it "coolant".

One of the key mathematical observations of a state of matter being in a state of 'perfect' inertia is that this correspond to the matter being in a identify matrix of  $I$  in its dynamics. Therefore, from our assumption of a state of superconductivity being in a perfectly inert state, then this is achieved from turning the dynamics of a system into the  $I$ .

A huge mathematical issue exists with these postulates since to turn the matrix  $W$  into  $I$  requires use of its inverse  $W^{-1}$  to multiple together such that  $WW^{-1} = I$ . For the vast majority of matrixes, their inverse does not exist. Furthermore, the matrix  $W$  must be square and have a non-zero determinant. Therefore, if we are considering  $W$  to well represent the mathematical dynamics of a system, in the vast majority of cases,  $W$  will not be square and thus not have an inverse. To solve this problem is the role of the coolant.

We shall consider the main role of the coolant to "divide" the matrix  $W$  into two parts,  $S$  which is the square matrix which has an inverse, and  $R$  which shall be called remainder for it is the remaining parts of  $W$  which could not be put in  $S$ . Therefore, it goes  $W \cdot C = (S + R) \cdot C$ . Note that I am using mathematical notation

here not in a strict sense, but more in a general sense to communicate the meaning of my ideas.

Now I am going to assume that all of the momentum vectors that are in  $S$  have conjugate pairs in  $C$  such that  $P(s) + P(c) = 0$ , and the  $S(-1)$  matrix is effectively the set of momentums on which when added to  $S$  yield a net momentum of 0. For the purpose of discussion here, we shall assume  $C$  is able to supply these conjugate momentums immediately.

Now, the matrix  $SS(-1)$  has turned into the Identity matrix  $I$  and through typical matrix transformations cannot be changed. If this were the end of the story of superconductivity, then superconductivity would be a permanent state of matter that would not require additional cooling. This is where the magnetic monopole process comes in.

Fundamentally, in this context, we shall define the mathematics of a magnetic monopole as that transformation which turns the identity matrix into some matrix  $Q$  with non-zero momentum. This process is fundamental in my opinion for which this, much of the universe would turn into the frozen, inert superconductive states that mean that the universe would rapidly freeze. The transformation from  $I$  to  $Q$  will include an profound expansion of phase space such it can be entropically favored for  $Q$  to be chemically, physically interact with the rest of the universe. This transformation will look like a spontaneous heating of the superconductor.

Now, let use consider our simple model in the context of monopole heating and thus the necessity of continuous cooling in the context of the superconductors. In the transition of  $W * C \rightarrow SS(-1) + R * C$  we shall then model the monopole heating as  $I(MH) \rightarrow Q$ . Now, if the coolant  $C$  is large enough mathematical sense then it should be able to maintain the superconductor process this the method previously described. Therefore, assuming  $Q$  is a non-square matrix, we can simple replace  $Q$  with  $W$  in our previous description and otherwise the process will work out the same. However, if the coolant  $C$  is not able to divide  $Q$  into a square matrix  $S$  with a remainder  $R$  then the superconductor will fail and depending on the exact dynamical nature of  $Q$  could initiate the dangerous phenomena of superconductor quenching where the superconductor explodes.

Now why does all this thinking matter for creating a mathematical model of consciousness and human imagination and ingenuity? The reason is that the

phase space expansion from  $I(MH) \rightarrow$  is the physical process where new ideas are deposited into reality.

First, consider that our very simple model can model the first moments of the big bang where reality is just this inert identify matrix and monopole heating comes in to expand phase space to heat the universe. Each time a new superconductivity state is reached, in general, a new monopole will be produced to enable the heating/ entropic expansion which will be along new degrees of freedom in phase space. These new degrees of freedom will be the “new idea” and the dynamics of  $Q$  will encode the “new idea”. Melding  $Q$  with other physical system will then allow “exploration” of how this new idea will apply and interact with other systems. In general, I believe this is what the brain does in order to create new ideas to model and predict reality as well as manifest consciousness.

Now combine these theoretical ideas with the empirical arguments of Stuart Hammeroff and Roger Penrose Orchestrated Objective Reduction (OrchOR). What I call the empirical argument of OrchOR is the simple observation of how anesthetics cause a “shut down” of consciousness as well as their peculiar interactions with microtubules within cells that seem to “cause” this loss of consciousness.

The combination of these two ideas is that the anesthetic compound is raising the cooling requirement of  $C$  out of reach of the cell/system. Without the production of new monopoles/monopole heating, consciousness in my framework is turned off.