The Schrödinger Cat Thought Experiment Land (The SCTE Land)

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Abstract: Following a short review of ten well-known objections to Schrödinger Cat Thought Experiment, fourteen new objections are presented that show the central thought experiment of quantum mechanics violates the second law of thermodynamics. These objections are shown to be equivalent to Smarandache Sorites Paradox that is how <A> and <Non-A> are connected.

Keywords: Schrödinger Cat Thought Experiment, Second law of thermodynamics, Smarandache Sorites Paradox

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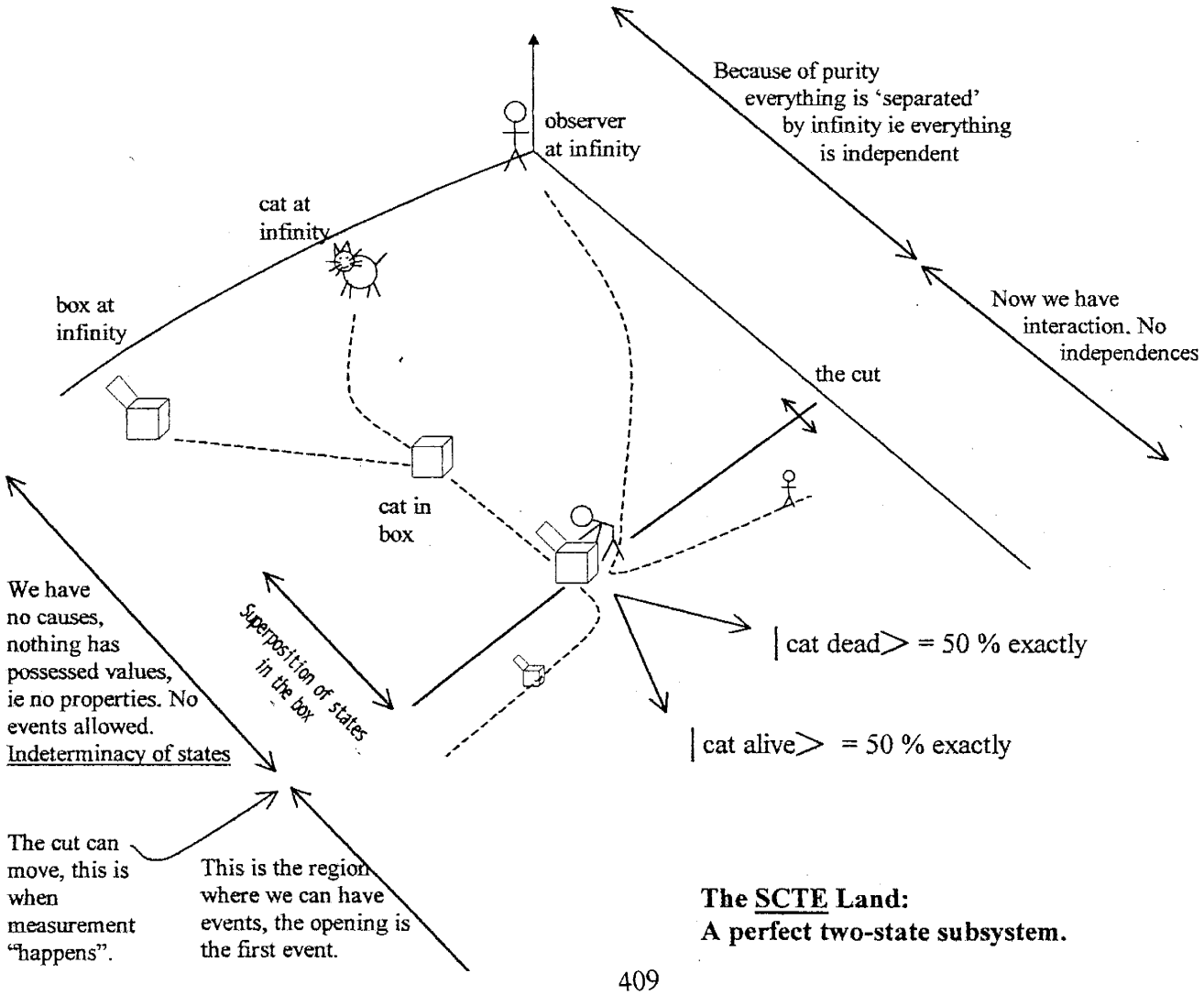
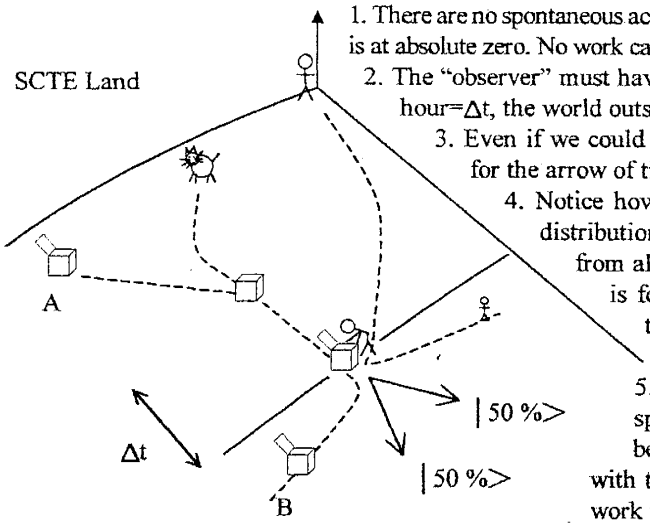


General on principle objections to the cat in the box thought experiment about absolute measurement. These are well known objections.

1. The wavefunction of the cat Ψcat and the Ψobs of the observer must be pure, no interaction is allowed between them until the opening. This is only physically achievable when infinitely far away from each other. So how so they meet?
2. Before the opening no quantum states occupied so no properties. Nothing is (literally) in this region because prior to the event, no states. So where do (the) properties come from? Or can/do states exist without properties?
3. It's one (sort of) event; we disallow any other event tainting the thought experiment. So how does anything else happen?
4. It's the only event, we have isolated "one" quantum system this isn't possible, quantum mechanics is (w)holistic, no such independent subsystem allowed. The SCTE cannot have parts, no (moving) parts. So how does the SCTE proceed?
5. It's the first event, before this no events, ie superposition, causes are not allowed, so the SCTE is the first event. What is there, to cause the first event, all we have is after the first. The SCTE is uncaused. So what causes the SCTE?
6. How do we trap the cat perfectly, only an infinitely deep (potential) well can achieve this? The cat cannot penetrate such a barrier. So how does the cat get out of the box?
7. If the cat is perfectly trapped, it must be in an infinite deep potential well. How does the observer quantum tunnel to the cat, ie open such a box? So, it's impossible for the observer to open the box. So how does the observer open it?
8. To construct the box we need material that is barrier-proof; perfectly rigid, such material isn't possible. So, how do we (physically) construct the box of the SCTE?
9. Splits the world into two realms. We have indeterminacy (ie superposition) of states that in turn passes to a world of indeterminism where things (only) might happen, only probabilities. Uncertainty rules. So how can we be sure of anything? Even if anything did/does happen?
10. One observer only. Wigner's Friend Paradox resolved by one (absolute) observer. But supposedly there are many equal (ie ontological/epistemological) observers! So, one observer can only do the SCTE. So how do we get many equal observers to perform the SCTE?

Objections to Schrödinger's Cat Thought Experiment

Thermodynamic Objections



1. There are no spontaneous accessible microstates. The Schrödinger's Cat Thought Experiment SCTE land is at absolute zero. No work can be introduced to open a perfect two-state box system, recall purity of states.
2. The "observer" must have maximum available macrostates to open a perfectly rigid box. For one hour=Δt, the world outside the box has no definable entropy at all.
3. Even if we could open the box, it is at zero entropy with no definable temporal direction for the arrow of time, since no definable irreversible processes.
4. Notice how the box itself, goes through a Poincaré cycle of entropy return. The distribution of parts for the box at point A to point B is the return of all entropy from all the time before the box closed to all the time after it was opened. That is for one hour; the box; its contents; and the cat cycles (=superpositions) through all Wingers' friends, ie all observers and the total outside universe, as one whole.
5. The cat itself must have minimum available microstates and none spontaneously available. There is no environment available at all to the cat before the box closes the first time because the cat isn't in a bound state with the "observer" until the box opens the second time, you see time, cannot work twice. (There is no "negative" entropy to pay for a perfectly rigid box, to have time working in both directions at once. Where does this work, the second time come from?)
6. The cat and the box A until it captures the cat, form their own private time system, these hidden variables to the "observer", are never revealed. The "observer" before the box opens the second time, must be independent strictly, even by times' workings because the SCTE land is a perfect two-state system. There are no mixed states between the box and the observer before the 50%50% event. Recall, perfect preparation of states.
7. The 2nd law of thermodynamics thermal states is represented as a stationary principle of a complex deterministic equation. Schrödinger's equation is this deterministic equation, it is a stationary state, entropy cannot both be a max and a min at the same time, it needs to be a max the second time, and a min the first time, time worked, if you understand the confusions. The spontaneous accessible microstates of the Schrödinger cat energy operators, are obtained by "perturbations" of the stationary complex plane states, these represent the ensemble of the cat as an explanation for probability itself that is entropy recurrent time is accessible spontaneous, to the cat.
8. We have for one hour, i) a spontaneous accessible Poincaré cycle, hidden to the observer
   ii) time working forward and backward at once, max and min at once
   iii) a frozen temporally directionless land, that is an event perfectly frozen
9. We have made the wavefunction, the carrier of ultimate information; it is entropy itself. We have made the "measurement" of the SCTE so perfect; it is in really absolutely perfect land. What is entropy itself in normal qm it must be the wave function, the entity that all information of the system resides, and how does this thing-in-itself transfer itself to temporal agents? Entropy the temporal process explains each and every counting event within time, & Ψ explains everything in time and of time by a timeless mathematical transformation $\mathbb{C}\rightarrow\mathbb{R}$ for temporal part distributions.
10. Instead of one hour let Δt equal Poincaré Cycle time, we can by inspection see that between Box A + Box B > Poincaré time, strictly

cycle time of the cat and the box against and the independent cycle time of the "observer" during point A and the first closing of the box? We have assumed perfect states without environment. Perfect states barren of real-valued eigenvalues only reside in the Complex plane itself. The initial conditions are that the cat and the box are states with complex eigenvalues, where the observer must be real valued.
11. Instead of one hour let Δt equal zero cycle time, we can see by inspection that this must be a two-state system that has zero entropy for its parts distribution. That is by looking at the role of thermodynamics in the SCTE Land we are lead to the conclusion that the event is a very very very special case it is the zero entropy state. From which we have temporal max-ing and min-ing of the wavefunction of the projected atemporal state that of eigenvalue i. Gold's universe comes to mind the universe begins and ends at the common zero entropy state: - that of a perfect two-state system. In the normal qm interpretation the system has complex and real values that are in a mixed states we have imbued the box with complexity and reality and naturality (=numbers complex, real and natural) by virtue that we humans = Winger's friends can do a perfect two-state experiment. Complex Real and Natural valued operators are in mixed states in the normal qm interpretation of the SCTE.
12. The Box at Point A to the cut has a normalization constant of zero exactly; from the cut to point B the Box has a normalization constant of one exactly. Yes exactly zero chance of a temporal event before the 2nd opening of the box. The Box has two normalization constants that of zero and one at different 'times' throughout all paths of all histories of the cat, or the box. We have made time itself work twice if the SCTE is a "measurement" that humans can achieve in reality. We are barred by the 3rd Law of thermodynamics from reaching a region of (quantum) event space that is at zero absolute temperature and we are excluded by qm itself from regions where states only have complex eigenvalues. Also by the figure above the 2nd Law is identified formally as the mechanism of the 2nd opening of the box if the box is identified with irreversible events that is events that are not reversible within the Poincaré cycle time of all observers everywhere.
13. That is by point 12 empty boxes must superposition that is the fundamental postulate of qm is undermined. It is impossible by normal qm to interpret a normalization constant of zero. The 'meeting' of the cat and the box have exactly zero chance of being a temporal event done by temporal observers bound by the laws of thermodynamics as it applies to us humans and not what 'happened' at time=zero exactly. We have a perfect two state-system that of quantum states being complex or real-valued, being in a superposition state or a deterministic state of the Schrödinger equation, in a $\mathbb{R}$ temporal environment projected from, the $\mathbb{C}$ atemporal plane, with $\mathbb{N}$ temporal discrete objects.

14. What event do we have a name for that acts like this it is the state that has zero entropy it is the state that all temporal states (real valued states) are both a max and min that is it acts as the $\mathbb{C}$ quantum mechanically stationary state for all real-valued states. It is the limit point for all events temporal, and it is the creation of temporal processing itself for natural numbered eigenstates. The only consistent interpretation for all these objections is that the timeless explanation for the STCE Land is the big bang/crunch eigenvalue system. $\mathbb{C} \rightarrow \mathbb{R}$

What these objections mean:

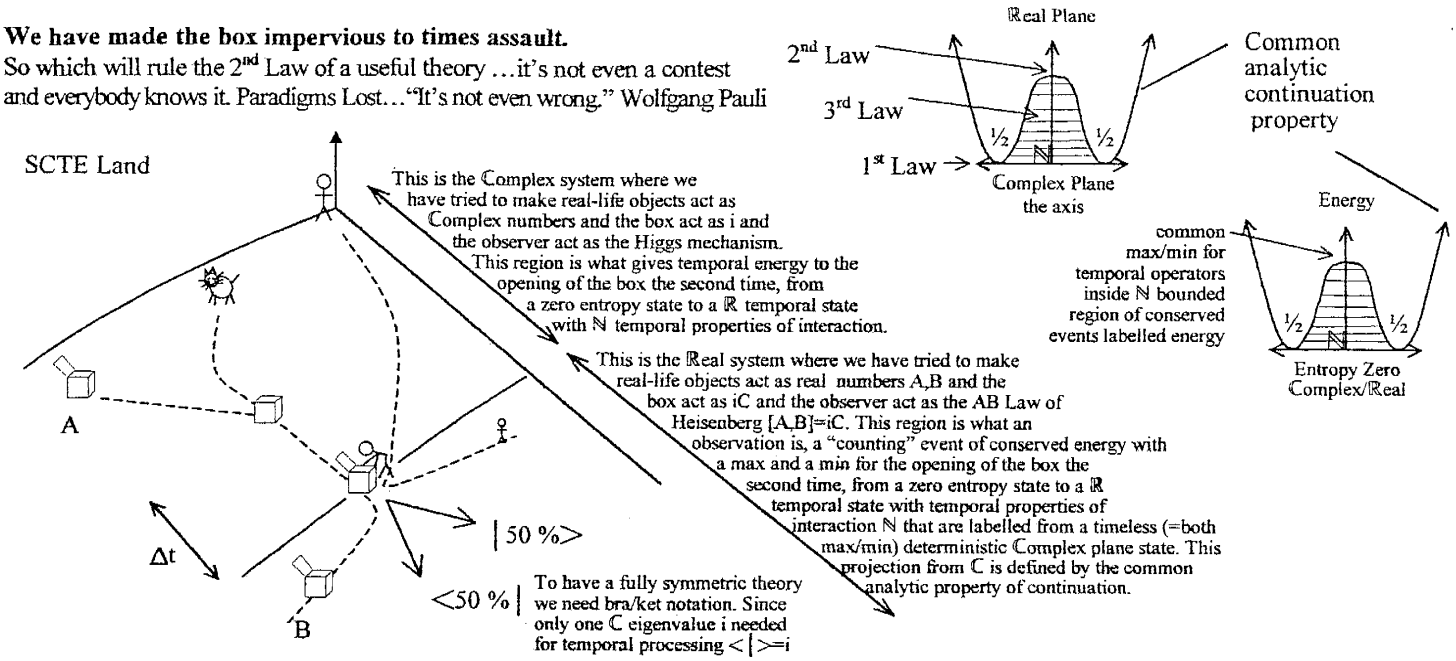
Penrose calls thermodynamics a <u>useful</u> physics theory, and quantum mechanics superb but the cat in the box experiment directly contradicts the 2nd law of thermodynamics, which will rule, the 2nd law of a useful theory or the central thought experiment of what a "measurement" is, the SCTE experiment is a perfect two-state quantum system, its just that it's too <u>perfect</u>, think of it this way it is in perfect land, it is at "infinity" to real-life cats and real-life people it is at "zero entropy land". Real-life boxes leak; there are no perfectly rigid boxes, only at "infinity" in some sense. Recall at absolute zero, we still have zero point motion due to the uncertainty relationship itself but a land at zero entropy stills even this last residue of temporality. We've made it too perfect, no human can do the "first" or "last" of a perfect two-state system. The SCTE land is the "measurement" of measurements, it is what measurements after the box opens the second time limit to, it is the limit point of B, and the box closing the 1st time is the limit point for the box A. How does a zero entropy "observer", interact with real-life observers barred by the 3rd law – a system cannot be cooled to absolute zero in a finite number steps? The land is truly beyond the reach of man or anything in time and of time, that is temporal operators bound by real-life laws of physics.

Objections to the "measurement", what the objections are directed at is not quantum mechanics itself, but what we made the thought experiment attempt to do, this "measurement" is at zero entropy, the arrow of time is indefinable, and there is only one wavefunction $|\ 50\%\rangle + |\ 50\%\rangle$ superpositioning in its own absolute time frame of the Complex plane. The SCTE is a valid qm "event", but its in perfect land, the "measurement" can only be achieved, by the wavefunction itself, acting in its role as absolute carrier of information, recall in qm real eigenvalues are obtained by "atemporal" projections from the Complex plane. The wavefunction is entropy itself, the wavefunction contains all true information, and the SCTE is a perfect two-state system, where the wavefunction is a complex stationary state. What is the "measurement", that changes the total wavefunction of the complex plane, into a real-eigenvalued world of temporal directedness, the "measurement" is the creation of time itself. The bang of time is a perfect two-state system, of things in time and things out of time. Things out of time are the complex plane and its operators, things in time are the real plane and it operators. The "observer" of this "measurement" is the two-state operation of the complex plane that gives i as the only eigenvalue.

Eddington expresses it best (as quoted in <u>The World within the World</u> by John Barrow Chapter 3 Unseen worlds, §13 Thermodynamics)

> "The law that entropy increases – the Second Law of thermodynamics – holds, I think, the supreme position among the laws of Nature. If somebody points out to you that your pet theory of the universe is in disagreement with Maxwell's equation – then so much the worse for Maxwell's equations. If it is found to be contradicted by observation – well, these experimentalists do bungle things sometimes. But if your theory is found to be against the Second Law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation."

We have made the box impervious to times assault.
So which will rule the 2nd Law of a useful theory ...it's not even a contest and everybody knows it. Paradigms Lost..."It's not even wrong." Wolfgang Pauli



That is the task of this generation is to save the Schrödinger Cat Thought Experiment SCTE Land from observational contradiction with the 2nd Law of Thermodynamics. For I am truly sorry for these objections this paper has been hard to write, because of the shame of it.

CONCLUSION

There are four paradoxes known as the Quantum Smarandache Paradoxes; the first paradox is:

Smarandache Sorites Paradox:

Our visible world is composed of a totality of invisible particles.

a) An invisible particle does not form a visible object, nor do two invisible particles, three invisible particles, etc.
However, at some point, the collection of invisible particles becomes large enough to form a visible object, but there is apparently no definite point where this occurs.

b) A similar paradox is developed in an opposite direction. It is always possible to remove a particle from an object in such a way that what is left is still a visible object. However, repeating and repeating this process, at some point, the visible object is decomposed so that the left part becomes invisible, but there is no definite point where this occurs.

Generally, between <A> and <Non-A> there is no clear distinction, no exact frontier. Where does <A> really end and <Non-A> begin?

How the SCTE land resolves the above paradox is:

Our visible world is made possible by invisible particles (literally the complex state that has eigenvalue i)

The imaginary component of a general complex number is called i, it is the invisible particle (number) that all visible "measurable" properties of objects are timelessly obtained via a quantum (Schrodinger) equation. The imaginary i is the entity that all measurements rely on, yet cannot be measured by definition since only real number eigenvalued states are observable. Recall the 'Heisenberg' law [A,B]=iℂ shows how quantum variables are connected mathematically. The SCTE land shows that the region before the cut behaves as the Complex number system where we have tried to make real-life objects act literally as Complex numbers and the box the imaginary i since we have perfect preparation of the two states. If in the SCTE we insist that the cat cannot escape the box (i.e. perfect containment) for Δt we are forced by the 14 thermodynamic objections above to conclude that the invisible (non-measurable) i leads to all visible objects (measurements). The frontier between <A>=measurement and <Non-A>=Non-measurement is represented exactly by the cut where we have tired to make time work twice (objection 8ii). The quantum cut is literally the frontier between <A> and <Non-A> mathematically it is the timeless transformation that changes pure complex numbers into pure real numbers denoted $\mathbb{C}\rightarrow\mathbb{R}$. Loosely speaking **Smarandache Sorites Paradox** (associated with Eubulides of Miletus (fourth century B.C.)) is the linguistic equivalent of the 'Heisenberg' law, how invisible particles create a visible world.

From §10 "THE PRINCIPLES OF QUANTUM MECHANICS" by P.A.M. Dirac Fourth Ed Oxford Univ. Press 1958, reprinted 1978

> "When we make an observation we measure some dynamical variable. It is obvious physically that the result of such a measurement must always be a real number, so we should expect that any dynamical variable that we can measure must be a real dynamical variable. One might think one could measure a complex dynamical variable by measuring separately its real and pure imaginary parts. But this would involve two measurements or two observations, which would be all right in classical mechanics, but would not do in quantum mechanics, where two observations in general interfere with one another—it is not in general permissible to consider that two observations can be made exactly simultaneously, and if they are made in quick succession the first will usually disturb the state to the system and introduce an indeterminacy that will affect the second. We therefore have to restrict the dynamical variables that we can measure to be real, ..."

We cannot make time work twice (equivalent to Dirac's measuring separately a complex number's real and pure imaginary parts) clearly <A> and <Non-A> are separated by quantum interference (that is the cut is literally this interference). This affect is dramatically demonstrated in the SCTE land where this interference literally is drawn and is identified as the timeless transformation $\mathbb{C}\rightarrow\mathbb{R}$ or <Non-A>→<A>.