

>> PHYSICS FORUMS VALUES
Physics > Quantum Physics >

A Proof that thermal interpretation of QM is wrong

- Topics based on mainstream science
- Proper English grammar and spelling

♥ We Value Civility

- Positive and compassionate attitudes
- Patience while debating

🔧 We Value Productivity

- Discipline to **Demystifier**
- Recognition of **own weaknesses**
- Solo and co-op problem solving



Demystifier

Insights Author

2018 Award

#1

:9,618

:2,688

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)
Locate Where To Buy Nikon Eyes® With Transitions Lenses®, And Support Kids In Need.

M [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

M [How to find E field when H field is given](#)

M [Proof that thermal interpretation of QM is wrong](#)

Preface

After a lengthy discussion of the thermal interpretation of quantum physics in <https://www.physicsforums.com/threads/the-thermal-interpretation-of-quantum-physics.967116/>, now I think I can prove that it is wrong, i.e. that it doesn't solve the

measurement problem in a way it claims it does. Since the following is supposed to be a final proof, I don't want it to be lost among many other posts in the thread above. That's why I open a separate thread.

Introduction

Here I want to prove that the thermal interpretation, contrary to its claim, cannot solve the measurement problem. For definiteness I will

present the measurement problem in the form of the Schrodinger cat paradox, but it can be presented in other forms as well. I will prove that

the Schrodinger cat "paradox" is a true paradox within the thermal interpretation that does not have a solution within that interpretation.



Join Physics Forums Today!
 The friendliest, high quality science and math community on the planet. Everyone who loves science is here!

Let $\rho^{(\text{cat})}$ be the density matrix describing the cat degrees of freedom. In principle, it is determined by the density matrix ρ of the whole

Universe as

» **PHYSICS FORUMS VALUES**

$$\rho^{(\text{cat})} = \text{Tr}_{\text{no cat}} \rho$$

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on topic
- Recognition of own weaknesses
- Solo and co-op problem solving

where $\text{Tr}_{\text{no cat}}$ denotes the trace over all degrees of freedom except the degrees of freedom of the cat. Since $\rho^{(\text{cat})}$ describes an open system, its dynamics is very complicated and nonlinear. Since the details of its influence on the environment "no cat" degrees of freedom on the cat are not known in practice, the evolution of $\rho^{(\text{cat})}$ in practice can be described by stochastic equations. The thermal interpretation conjectures (without an actual proof) that this complicated, nonlinear and effectively stochastic evolution can explain why the superposition of

SHARE THIS PAGE

an alive and a dead cat is unstable, so that the system exhibits a fast decay towards an either dead cat or alive cat. Here I prove that this



The central idea of my proof is to consider the problem from the point of view of the whole Universe, instead from the point of view of the cat.

LATEST THREADS

Even though the whole Universe is in principle much more complicated than the cat, this actually simplifies the analysis because it is known that the whole universe evolves unitarily, given by the unitary evolution

operator
What does the constancy of light of speed mean?

$$U(t) = e^{-iHt}$$

M Load applied at an angle

where H is the Hamiltonian of the Universe.
How to find E field when H field is given ?

The proof
Proof that thermal interpretation of QM is wrong

Let $\rho(t)$ be the density matrix of the whole Universe. In general, it evolves with time according to $\rho(t) = U(t)\rho(0)U^\dagger(t)$

Now suppose that initially $\rho(0) = \rho_{\text{alive}}$, where ρ_{alive} is the state of the Universe with an alive cat. The alive state is stable, i.e. the cat who is initially alive will stay alive for a long time. Hence we can write



Join Physics Forums Today!
The friendliest, high quality science and math community on the planet. Everyone who loves science is here!



$$U(t)\rho_{\text{alive}}U^\dagger(t) = \rho_{\text{alive}}(t)$$

» **PHYSICS FORUMS** ~~VALUES~~ of the Universe with a cat alive during a long time. Similarly, if initially $\rho(0) = \rho_{\text{dead}}$ then we have a dead cat for a long time, so

We Value Quality we can write

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on topic
- Recognition of controversial issues
- Solo and co-app problem solving

But what if initially we have the superposition of a dead and an alive cat? It is certainly possible as an initial condition, but the question is what happens with such a superposition later? Is it stable or unstable?

To simplify the analysis we shall assume that the initial superposition is incoherent, i.e. that



SHARE THIS PAGE



$$\rho(0) = \frac{1}{2}\rho_{\text{alive}} + \frac{1}{2}\rho_{\text{dead}}$$

without the interference term. (We shall show later that inclusion of the interference terms does not change the final results.) Hence the

linearity of evolution for the whole Universe implies

$$U(t)\rho(0)U^\dagger(t) = \frac{1}{2}\rho_{\text{alive}}(t) + \frac{1}{2}\rho_{\text{dead}}(t)$$



What does the constancy of light of speed mean?

This proves that the superposition is stable, i.e. that there is no decay to $\rho_{\text{alive}}(t)$ or $\rho_{\text{dead}}(t)$.



How to find E field when H field is given?

Now what about beables in the thermal interpretation? All beables in the thermal interpretation are of the form



Proof that thermal interpretation of QM is wrong

$$\langle O(t) \rangle = \text{Tr} O \rho(t)$$

where O are hermitian observables. So if O is a cat observable that describes some actual properties of the cat, we see that the actual property of the cat is



Join Physics Forums Today!

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!



$$\langle O(t) \rangle = \frac{\langle O(t) \rangle_{\text{alive}} + \langle O(t) \rangle_{\text{dead}}}{2}$$

» **PHYSICS FORUMS VALUES**

which is neither $\langle O(t) \rangle_{\text{alive}} \equiv \text{Tr} O \rho_{\text{alive}}(t)$ nor

$\langle O(t) \rangle_{\text{dead}} \equiv \text{Tr} O \rho_{\text{dead}}(t)$. This proves that beables of the thermal

- Top level based on mainstream science
- Proper English grammar and spelling
- Straightforward generalization of this proof, one can see that thermal interpretation cannot resolve the measurement problem of quantum physics in general.

» **We Value Civility**

- Positive and compassionate attitudes
- Patience while debating

» **We Value Productivity**

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

Note that the cat beable can also be written as

» **SHARE THIS PAGE**

$$\langle O(t) \rangle = \text{Tr}_{\text{cat}} O \rho^{(\text{cat})}(t)$$

where $\rho^{(\text{cat})}(t)$ (given by the first equation in **Introduction** above)

satisfies a nonlinear equation and Tr_{cat} denotes tracing over cat

degrees of freedom. The thermal interpretation conjectures that this

nonlinearity can somehow cause the decay towards an either dead or

alive cat. What our proof shows is that this conjecture is not true, which

is a consequence of the fact that the Universe as a whole obeys a linear

evolution. No matter how complicated and apparently stochastic

behavior of a subsystem may be, the unitary evolution of the whole

Universe implies that it cannot solve the measurement problem within

the thermal interpretation.

» **LATEST THREADS**

R [do electromagnetic wave moving in upside down form?](#)

[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

[Finally a note on the ignored interference terms. If the initial state of the Universe is a coherent superposition](#)

[Proof that thermal interpretation of QM is wrong](#) $\frac{| \text{alive} \rangle + | \text{dead} \rangle}{\sqrt{2}}$

then the initial $\rho(0)$ has the additional interference term

$$\rho_{\text{interf}} = \frac{1}{2} | \text{alive} \rangle \langle \text{dead} | + \frac{1}{2} | \text{dead} \rangle \langle \text{alive} |$$



[Join Physics Forums Today!](#)

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!



In principle this contributes to beables via terms of the form

» **PHYSICS FORUMS VALUES** $\text{Tr}O|alive\rangle\langle dead|$

We Value Quality

- Topics based on mainstream science
- Proper use of the terms of the

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Different eigenstates of x , in which case it's easy to see that the term above vanishes.
- Recognition of own weaknesses
- Solo and co-op problem solving

However, if O is an observable that distinguishes a dead cat from an alive one, then the terms of the above form are negligible. For instance, if O is distinguished from an alive one by having a closed/open eye, then O can be taken to be the position operator x describing the position of the eyelid, while $|alive\rangle$ and $|dead\rangle$ are proportional to two different eigenstates of x , in which case it's easy to see that the term above vanishes.

Last edited: 16 minutes ago

SHARE THIS PAGE

Related Quantum Physics News on Phys.org



- New research adds to work of Prandtl, father of modern aerodynamics

LATEST THREADS

Order of quantum particles gives clues to big-picture behavior at large scale

• electric magnetic wave moving in upside down form?

What does the constancy of light of speed mean?
Today at 4:41 AM

#2

Load applied at an angle
A. Neumaier

:5,792

How to find E field when H field is given ?

Science Advisor Insights: Author

:2,043

Proof that thermal Demystifier said: interpretation of QM is wrong

Finally a note on the ignored interference between the initial state of the Universe is a coherent superposition

$$\frac{|alive\rangle + |dead\rangle}{\sqrt{2}}$$



Join Physics Forums Today!
The friendliest, high quality science and math community on the planet! Everyone who loves science is here!



then the initial $\rho(0)$ has the additional interference term

» **PHYSICS FORUMS VALUES** $\frac{1}{2}|\text{alive}\rangle\langle\text{dead}| + \frac{1}{2}|\text{dead}\rangle\langle\text{alive}|$

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

However, if O is an observable that distinguishes a dead cat from an alive one, then terms of the above form are negligible. For instance, if the dead cat is distinguished from an alive one by having a closed/open eye, then O can be taken to be the position operator x describing the position of the eyelid, while $|\text{alive}\rangle$ and $|\text{dead}\rangle$ are proportional to two different eigenstates of x , in which case it's easy to see that the term above vanishes.

SHARE THIS PAGE

In your final note, which is the only part relevant to the problem, you assumed the link between measurement results of O and eigenstates, which is not valid in the thermal interpretation.

LATEST THREADS

R Today at 15:11 AM #3
magnetic wave moving in upside down form?

 **Demystifier** :9,618
:2,688
What does the constancy of light of speed mean?
Science Advisor Insights Author 2018 Award

- M** Load applied at an angle
-  How to find E field when H field is given ?
-  Proof that thermal interpretation of QM is wrong

A. Neumaier said: 

In your final note, which is the only part relevant to the problem, you assumed the link between measurement results

 and eigenstates, which is not valid in the thermal interpretation. This is the highest quality science and math community on the planet! Everyone who loves science is here!

That's not essential at all. Alternatively, I can take $|\text{dead}\rangle$ and $|\text{alive}\rangle$ to be proportional to two macroscopically different coherent states $|p, x_1\rangle$ and $|p, x_2\rangle$, in which case my argument that the interference term is negligible applies without having position eigenstates.

» **PHYSICS FORUMS VALUES**

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

Demystifier said: ↑

SHARE THIS PAGE

But what if initially we have the superposition of a dead and an alive cat? It is certainly possible as an initial condition, but the question is what happens



You are assuming this ridiculous fallacy without any physical

justification or evidence. There is no such thing.

R do electricmagnetic wave moving in upside down form?

What does the constancy of light of speed mean?

Today at 5:16 AM

M Load applied at an angle



Demystifier

How to find E field when H field is given?



Proof that thermal interpretation of QM is wrong

Mentz114 said: ↑



Join Physics Forums Today! are assumed to be high quality scientific and math community on the planet! Everyone who loves physics is here!

But what if initially we have the superposition of a dead and an alive cat? It is certainly possible as an initial condition, but the question is what happens with such a superposition

You are assuming this ridiculous fallacy without any physical justification or evidence. There is no such thing.

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

If you are suspicious about cats (despite the fact that Schrodinger proved that it is possible if Schrodinger equation is always true) , consider spin in a superposition up and down. The proof doesn't change.

Today at 5:43 AM

 #6

SHARE THIS PAGE



A. Neumaier

 Science Advisor

 Insights Author



 :5,792

 :2,043

LATEST THREADS

Demystifier said: 

R [do electric/magnetic waves moving in upside down form?](#)
That's not essential at all. Alternatively, I can take $|dead\rangle$ and $|alive\rangle$ to be proportional to two macroscopically different coherent states $|p, x_1\rangle$ and $|p, x_2\rangle$, in which case my argument that the interference term is negligible applies without having position eigenstates.



M [Load applied at an angle](#)
But then your argument about properties is no longer valid. θ is not a quantity you can freely choose in your argument.



[How to find E field when H field is given ?](#)



Proof that thermal interpretation of QM is wrong
44 minutes ago

 #7



stevendaryl

 Staff Emeritus

 Science Advisor



Author

Join Physics Forums Today! 255

The friendliest, high quality science and math community on the planet! Everyone who loves science is here! 2,441



Mentz114 said: ↕

You are assuming this ridiculous fallacy without any physical justification or evidence. There is no such thing.
» **PHYSICS FORUMS VALUES**

We Value Quality
That's harsh, and also unhelpful (I think). It's true that there aren't actual states $|alive\rangle$ and $|dead\rangle$, but is this oversimplification important for the point @Demystifier is making? If so, can you show

We Value Civility
how a more careful treatment of cats would lead to a different conclusion? If not, then your remark is unhelpful.

We Value Productivity
What I think a more careful treatment would like is something like this:

- Discretion to remain on topic
 - Recognition of own weaknesses
 - Solo and co-op problem solving
- Presumably, a macroscopic configuration (a description at the level of cats and cyanide canisters) corresponds to some equivalence class of microstates. Some microscopic states are incompatible with

there being a live cat. So I assume that for a macroscopic configuration c (a description of the locations, types, shapes, and health of cats and so forth) there is a corresponding projection operator Π_c such that if microstate $|\psi\rangle$ is compatible with configuration c , then $\Pi_c|\psi\rangle = |\psi\rangle$, and if $|\psi\rangle$ is incompatible with c , then $\Pi_c|\psi\rangle = 0$.

R Then instead of talking about the states $|alive\rangle$ and $|dead\rangle$, we can talk about the projection operators.

 What does the constancy of light of speed mean?
Demystifier

M Load applied at an angle

 How to find E field when H field is given?
15 minutes ago

#8

 **stevendaryl**
Proof that thermal interpretation of QM is wrong
Staff Emeritus Science Advisor Insights Author

:8,255

:2,441



[Join Physics Forums Today!](#)

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

Demystifier said: ↕

But what if initially we have the superposition of a dead and an alive cat? It is certainly possible as an initial condition, but the question is what happens with such a superposition later? Is it stable or unstable? To simplify the analysis we shall assume that the initial superposition is incoherent, i.e. that

» **PHYSICS FORUMS VALUES**

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating evolution for the whole Universe implies

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

$$\rho(0) = \frac{1}{2}\rho_{\text{alive}} + \frac{1}{2}\rho_{\text{dead}}$$

$$U(t)\rho(0)U^\dagger(t) = \frac{1}{2}\rho_{\text{alive}}(t) + \frac{1}{2}\rho_{\text{dead}}(t)$$

This proves that the superposition is stable, i.e. that there is no decay to

SHARE THIS PAGE

I don't know about the thermal interpretation, but in some interpretations of quantum mechanics, the density matrix is interpreted to include subjective uncertainty. So being a mix of "alive" and "dead" is

COMPATIBLE READS

the cat being alive or dead, and you just don't know which (until you peek, to resolve the subjective uncertainty).

[do electricmagnetic wave moving in upside down form?](#)

If you consider the "density matrix of the universe" to be the most complete information there can be about the state of the universe, then

[What does the constancy of light speed mean?](#)

[Load applied at an angle](#)

[How to find E field when H field is given ?](#)

#9

Demystifier
[Proof that thermal interpretation of QM is wrong](#)
 Science Advisor

Insights Author

2018 Award

:9,618

:2,688

stevendaryl said: ↑



Join Physics Forums Today!

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

I don't know about the thermal interpretation, but in some interpretations of quantum mechanics, the density matrix is interpreted to include subjective uncertainty.

» **PHYSICS FORUMS VALUES**

That's not the case with thermal interpretation.

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Discouraged to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

#10

:9,618

:2,688

A Neumaier said:  **SHARE THIS PAGE**

But then your argument about properties is no longer valid. O is not a quantity you can freely choose in your argument.

All my argument requires is that O is a quantity that distinguishes a dead cat from an alive one. This requirement is indeed necessary if one wants the corresponding beable to determine whether the cat is dead or alive.

What does the constancy of light of speed mean?

Want to reply to this thread?

Load applied at an angle

"Proof that thermal interpretation of QM is wrong"

How to find E field when H field is given ?

You must log in or register to reply here.

Proof that thermal interpretation of QM is wrong

Related Threads for: Proof that thermal interpretation of QM is wrong

J

B

Possibility that all current interpretations of QM are wrong

Is something wrong with statistical interpretation of QM?



Join Physics Forums Today!
The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

U

» [R Neumaier Thermal Interpretation of QM, valid?](#)

[N We Value Quality](#) [J Interpretation of QM that psiontic, local, and has collapse?](#)

- Topics based on mainstream science
- Proper English grammar and spelling

[There is no Copenhagen interpretation of QM](#)

- Positive and compassionate attitudes
- Patience while debating

[Physics > Quantum Physics >](#)

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

[R do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

[M Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

[CONTACT US](#)

[TERMS OF SERVICE](#)

[PRIVACY POLICY](#)

[HELP](#)



© 2001-2019 Physics Forums

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)

 [What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)

 [How to find E field when H field is given ?](#)

 [Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!

» PHYSICS FORUMS VALUES

We Value Quality

- Topics based on mainstream science
- Proper English grammar and spelling

We Value Civility

- Positive and compassionate attitudes
- Patience while debating

We Value Productivity

- Disciplined to remain on-topic
- Recognition of own weaknesses
- Solo and co-op problem solving

SHARE THIS PAGE



LATEST THREADS

R [do electricmagnetic wave moving in upside down form?](#)



[What does the constancy of light of speed mean?](#)

M [Load applied at an angle](#)



[How to find E field when H field is given ?](#)



[Proof that thermal interpretation of QM is wrong](#)



[Join Physics Forums Today!](#) ×

The friendliest, high quality science and math community on the planet! Everyone who loves science is here!