



Dear Beakman,  
When will we be able  
to use a transporter  
like in Star Trek?  
  
Ronny Schumacher  
Kenosha, Wisconsin

Beakman or Jax  
P.O. Box 30177  
Kansas City, MO 64112

Dear Ronny,  
Sometimes science fiction is prescient  
(PRESH-ent) and predicts the future. Other times  
it's just good entertainment.

Star Trek's transporter is the second of those two  
- good entertainment.

The laws of the universe, which are usually called  
*physics*, get in the way of Scotty (or Chief O'Brien)  
beaming up (or energizing) anyone or anything.  
And you can't change or ignore the laws of the  
universe.



To beam a  
pile of marbles  
(or atoms) from disk  
A to disk B, you'd need  
to know precisely where  
the atoms are in relation to each other.

Without that, you couldn't reassemble  
anything properly. And we are not ever able  
to know precisely where they are for certain  
because of the Uncertainty Principle.



*Beakman*  
Beakman Place

# HEISENBERG PRINCIPLE: THE MIND MOVIE

Ask someone to read this to you out loud.  
Sit comfortably with your eyes closed. Get  
all peaceful-like by taking a couple of long,  
deep breaths.

Imagine that you are beside a swimming  
pool and you want to know the  
temperature of the water.

You touch your pocket and feel that there  
is a thermometer inside it. You pull out the  
thermometer and put it into the water.

When you lift out the thermometer, *You  
Can* see that the water is 88°.

Now let's rerun this part of the movie all  
over again, except you are now a giant, 80  
stories tall, and the swimming pool is now  
as small as a drop of water.

When you bring the thermometer out of  
your pocket, it will be about 98° - nearly

your body temperature. It's also huge -  
as big as a small building.

When you put it into the tiny water-drop-  
sized pool, the warmer thermometer will  
raise the temperature of the water. By  
measuring something, you changed it.

Because we always change the things we  
measure, we can't really know exactly  
where anything really is. With big stuff it's  
not much of a problem. But as things get  
small, like subatomic-particle small, it's a  
bigger and bigger problem.

Star Trek's transporters have a circuit  
called the *Heisenberg Compensator*. It's  
supposed to make up for the fact that we  
change things by measuring them.

The *Heisenberg Compensator* does not  
exist and probably never will because you  
can't just change the laws of the universe.



Werner Heisenberg  
1901-1976

## FAMOUS DEAD GUY IN PHYSICS

Nobel Prize  
Physics, 1932

Mr. Heisenberg discovered the *Uncertainty Principle*.  
Usually it is called the Heisenberg Principle as a way of  
honoring him. Mr. Heisenberg realized that every time you  
measure where something is, or how fast it is going, you  
change the thing you're measuring.

He said, "Whenever I make a measurement, I must disturb  
the system. In order for me to know  
something is there, I must bump into it."