

THE DISCRETE UNIVERSE

I believe in a discrete universe: a universe composed of discrete quanta of energy, discrete quanta of matter, discrete quanta of distance, and discrete quanta of time. My universe contains no continua of any kind and is not infinite.

The idea is not original. Max Planck saw the universe in similar terms in 1899, and even went so far as to evaluate these various quanta. The idea that matter and energy exist only in discrete quanta is the basis of modern physics. It is only a small step to add distance and time, and many scientists have done so. Logic compels it.

The dimensions of energy are mass, distance, and time. If any one of these were continuous, then their product—energy—would be continuous. It is not. Ergo, energy, mass, distance, and time are all discrete.

Energy: When an air molecule travels from one collision toward another, its kinetic energy of translation has one of a fixed number of possible energy levels. Each level is a whole number multiple of the basic quantum of energy. This molecule will never have a value in between any two allowable adjacent levels.

Mass: The very smallest sub-atomic particle is composed of whole number multiples of the quantum of matter (whatever that is). It cannot have values in between those whole number multiples. Masses having such values cannot exist in the real universe.

Distance: Take any two real points in the Earth's atmosphere, and the distance between those two points is composed of a whole number multiple of the quantum of distance (whatever that is). There are no points in between any two adjacent spatial quanta. There is here and there is there. It is not possible to be neither here nor there in the real universe.

Time: Likewise, the arrow of time moves discretely in whole number multiples of the quantum of time. Here, we have a perfectly good name in the English language—the instant. Time's Arrow is made up of a sequence of individual instants. When a photon of solar radiation is absorbed by some atmospheric vapor molecule, it ceases to exist. One instant it is, the next instant it is not. There is never a time when it is in between being and not being.

Summary: I see the known universe as a discrete entity composed of other discrete entities. All measurements are composed of discrete units on a discrete scale. Both infinity and continua are mathematical concepts that have no correspondence in reality.