

title -

Information Content of the Universe and a Helium Atom

author -

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abstract -

Today's hard drives require about a million atoms to store one bit. Nanotechnology is testing methods to store an electronic 1 or 0 using a cluster of 12 iron atoms or a molecule created from two uranium atoms. These paragraphs go way beyond present technology. The first step suggests technology of the extremely distant future will manipulate quarks to store 3 bytes in a single helium atom. The second step suggests helium is united with atoms of iron, uranium, etc. via wave-particle duality and has a potential information content, thanks to cosmic wormholes, equal to the universe's (here, that data content is limited to the observable universe's and estimated as 3×10^{80} bytes). Since there were originally 8 bits in a byte, an alternative way of viewing a helium atom would be to regard it as being composed of eight times 3×10^{80} bits or Binary digITS (again underestimating the true data content since this value is based on the observable universe, and I believe the universe is actually infinite).

content -

To introduce some thoughts of mine, I'll start by quoting a few lines from the article "Lilliputian Storage Wars" by Elizabeth Svoboda, in Discover magazine's May 2012 issue -

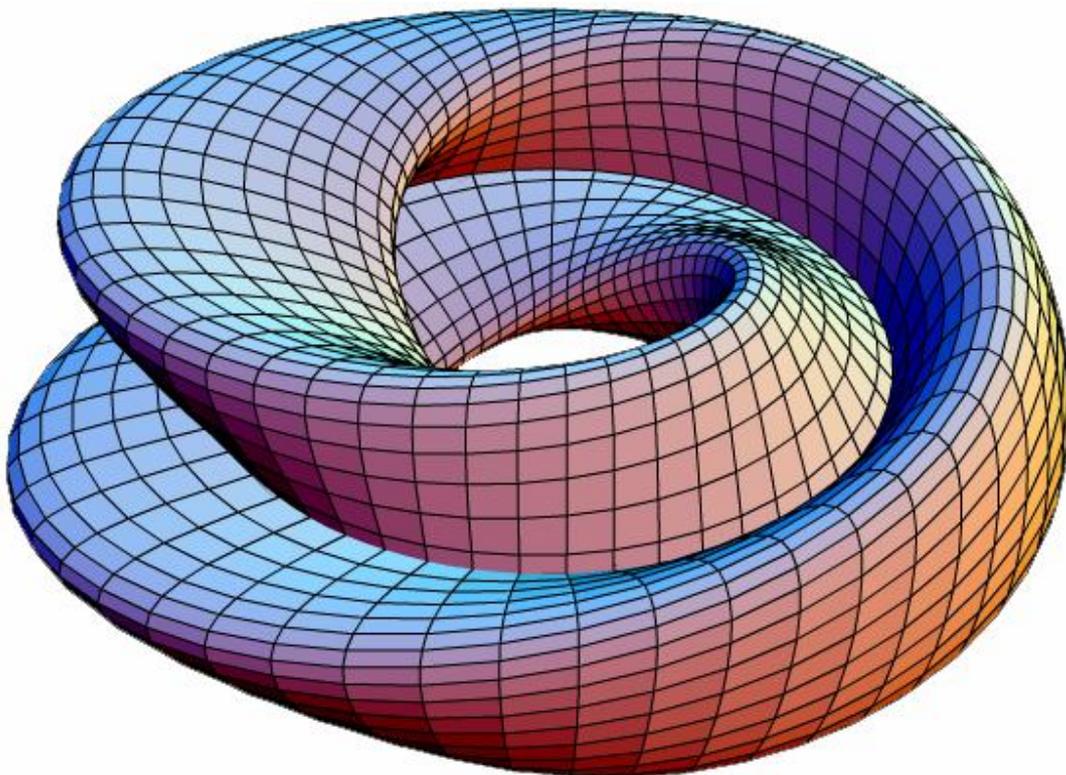
"... Andreas Heinrich, a nanotechnologist at IBM's Almaden Research Center ... coaxed a cluster of 12 iron atoms to store one bit of data, consisting of either a 1 or a 0. Today's hard drives require about a million atoms to store one bit. Heinrich did it by painstakingly using a microscope fitted with a tool to move the atoms into a formation. The arrangement induced each atom to take on a magnetic charge opposite that of its neighbor. This checkerboard configuration allowed far tighter packing than in current hard drives, where atoms of the same charge repel each other. Other contenders include German physicist Roland Wiesendanger, who is applying a similar technique to cobalt, and British chemist Stephen Liddle, who is testing a molecule he created from two uranium atoms."

Iron? Cobalt? Uranium? Let's go way beyond present technology and think about helium. In the first part of this example, we're going to ignore quantum mechanics

and wave-particle duality. So let's just concentrate, for the moment, on their particle function and let's strip the electrons from the atom and imagine the 12 quarks comprising the nucleus's 2 protons and 2 neutrons. There are definite points where each quark either exists or doesn't exist. One day, even if it takes a million years or more, technology will be able to access these individual points. Then if a 1 corresponds to the presence of a quark and a 0 corresponds to the quark's absence, a helium nucleus will consist of 24 bits. Originally, there were 8 bits in a byte so a nucleus contains 3 bytes whereas IBM's hard drive requires 288 atoms to store 3 bytes.

Now let's consider wave-particle duality. In this scenario, any two waves could merge and no separation need exist between my helium atoms and iron, cobalt, uranium, or any other atoms. According to Wikipedia, the Internet's free encyclopedia, "Two approximate calculations give the number of atoms in the observable universe to be close to 10^{80} ." For convenience, let's assume the entire universe consists only of helium (this is ridiculous assumption #1). Let's also assume the OBSERVABLE universe is, in fact, the ENTIRE universe (this is ridiculous assumption #2). Then the total information content of the universe would be 3×10^{80} bytes. Since no separation need exist between any two atoms, the potential data in just one helium atom would equal 3×10^{80} bytes.

Let's return to the abstract for a moment. There are more details spread throughout my previous submissions to viXra, but it might be helpful to present here a one-paragraph summary of what they say about cosmic wormholes and an infinite universe -



Mathematics' proved Poincare conjecture has implications for the universe's shape and says you cannot transform a doughnut shape into a sphere without ripping it. My interpretation follows: This can be viewed as subuniverses shaped like Figure-8 Klein Bottles (above; similar to doughnuts) gaining rips called wormholes when extended into the spherical spacetime that goes on forever, forming one infinite superuniverse. Acceleration of universal expansion was discovered in 1998 by observations carried out by the High-z Supernova Search Team and the Supernova Cosmology Project, has been confirmed several times, and I don't believe acceleration will ever end (see <http://vixra.org/abs/1203.0098>) Picture spacetime existing on the surface of this doughnut which has rips in it. These rips provide shortcuts between points in space and time – and belong in a 5th-dimensional hyperspace.