Norbert Hirschhorn: Something from nothing

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It's been our privilege to live at a time of the greatest flourishing of human knowledge since the invention of writing.

Think of it: With powerful telescopes (including the ones in space), we can say that the universe is 13.77 billion years old, give or take a few million. With massive electronic equipment, like the Large Hadron Collider in Switzerland, and complex mathematical models, we surmise that the universe began in a huge, instantaneous burst of the hottest energy, creating space and time as we know them: the Big Bang. With expansion, space cooled, "and there was light" some 300,000 years later.

After about a billion years, the force of gravity clumped the high-energy atomic particles, forming galaxies and stars. Recall that energy and matter are equivalent by Einstein's famous equation, E=MC2; think of matter as "frozen energy." Much later came the planets, as things cooled down further, our Earth a stripling, a mere 4.54 billion years old. How we know all this is based both on observation and mathematics.

When confronted with the challenge of explaining these complex phenomena to the general public, scientists have to rely on analogy. For instance, the recently discovered Higgs boson, an elementary atomic particle, somehow helped energy acquire mass in the way an energetic baseball hero gets weighed down and slowed up by "boson" fans clustering around him. (See an illustration at href='http://www.bbc.co.uk/news/science-environment-18707698'>http://www.bbc.co.uk/news/science-environment-18707698.) In "reality," that's not exactly what happens, but it's the best one can do with the limitations of nonmathematical language. Now, this is important: I have to trust those scientists in what they are trying to tell me, the same way I would trust a neurosurgeon who will dig into my brain to heal whatever is wrong.

Many articles and books have been written on cosmology, the origins of the universe, including ones by people who wonder what role to assign to God. In 1993, physicist Leon Lederman published a book on the Higgs boson called "The God Particle," entering into a debate that has pre-occupied philosophers for thousands of years: Did the universe just happen, or did a superior force, God, create it? Then, as a child would ask, who created God? Genesis 1.1 to 1.3 simply accepts that God is, and that "In the beginning," God created the universe, at first "without form, and void."

Physicist Lawrence Krauss, a firm nonbeliever, titled his book, "A Universe from Nothing." His conclusion, based on quantum theory, is that "nothing" was never just nothing, but always a potential "something." Quantum theory and mechanics (the bases of most of the electronic devices we enjoy) require that atomic particles drift in and out of existence spontaneously -- that is to say, energy-matter is always a virtual, potential something.

Wallace Stevens in his 1921 poem "The Snowman" describes an empty, bleak winter scene:

For the listener, who listens in the snow,
And, nothing himself, beholds
Nothing that is not there and the nothing that is.

From that "nothing that is" to become a something means the Big Bang followed the moment when one of those spontaneous quantum events suddenly released an incredible amount of energy, but whose potential always existed. Now, was this release a "one-time" event? Or are universes, inaccessible to us, being created all the time, even now?

Our universe exists only because certain physical values and properties of particles and their interactions are exactly what they are. Any slightest deviation, our special universe would not have come into being, which means we wouldn't be here at all as intelligent beings capable of making those very measurements!

Doesn't this reveal the hand of a Creator? Even scientists debate whether it is necessary to invoke a God as that ultimate physicist. Krauss doesn't think so. Einstein reflected in a more nuanced way that he believed in a God "who reveals himself in the orderly harmony of what exists."

We may never know the whole truth, but this shouldn't scare us. Perhaps there is more mystery, awe and appreciation of our place in the universe in the not-knowing. Yet how exciting it is that we keep on learning something new.