

Offered Title: Got a Minute?

That question means different things to the asker and the asked. The asker has what they think is a quick question, discussion, or topic. The asked on the other hand is immediately concerned about how his/her already slipping schedule will be impacted. Another hour behind?

According to relativity theory time is dependent on the observer's spatial reference frame.

Time, at its core is existential. Last week's article about sound brought up the concept of whether sound exists if no one or nothing hears it. Sound does exist in the physical nature of air (or other substrate) being compressed to form waves. Asking this question, does time have to be experienced to exist is trickier. Unlike sound, time is not a physical thing. But in context with space (a physical thing), time is affected (distorted) by something physical, mass and its associated gravity. Our friend Albert Einstein predicted the marriage of space and time, calling it spacetime. The distortion of spacetime by mass/gravity has been measured countless times.

Getting back to the question; when you sleep time appears not to exist to you even though it passes for those who remain awake. Spacetime however still exists as a physical property. So, time, since it apparently cannot be separated from space, must exist in the absence of experience. Existence itself is married to spacetime, no?

You will notice I haven't mentioned dark matter/energy. That's because they are unknowns currently but appear to play a dominant role. We just don't know how.

The branch of astronomy/physics called cosmology is deeply involved in studying spacetime. Questions such as... was there time before the beginning (the big bang?) and was there anything before the beginning are not trivial and a lot of energy is spent on answering them. We have no idea, really, what's beyond the wall, the beginning "big bang" remnant called the Cosmic Microwave Background. This is the farthest back in time we can "see" so far, but new generation telescopes might take us a little beyond, to new discoveries.

Cosmologists for the most part consider time beginning with the Big Bang and the creation of space. There are many hypotheses placing the Big Bang among other beginnings of other universes, which of course doesn't answer the questions. Even the "mother of thousands" had a beginning and there were beginnings before that.

We measure time, and have measured the shortest interval, around 12 attoseconds (1.2×10^{-17} seconds) and that's not even close to the theoretical shortest time interval of 5.39×10^{-44} seconds, called Planck time. In theory, as time intervals approach Planck time, it becomes too weird to understand. Current physics cannot explain it.

We know time moves in one direction and appears to stop at the speed of light. Photons live at the speed of light, so are they timeless?

What's in the Sky?

February 10; 7pm+; southwest: The crescent Moon and Mars share the sky

