

Time Is Local

I've always thought about time as something that orders and separates events the way space separates objects. It may be possible to go a step further and say that relationships between things create space, and relationships between and within events create time. Events are local and so time is local. When something "happens" something changes, there is motion involved, a change in relationships between things. That is all local. In the quantum realm, the concept of local does not always hold. That is why the concept of time doesn't always hold.

What is the difference between things and events? Although they are clearly different they are both configurations of matter and energy. An event is us catching the universe in the act of reconfiguring (change).

Change is an important thing for our minds to track, but our senses alone can't do it. Our brains track change by using memory, because change is a temporal process. Consciousness itself is more like an event (something that happens in time) than an object (in space). This could be why we so easily perceive time. And why our brains so easily act as time machines, remembering the past, tracking the present, and predicting the future.

Time is easy to track in the macro world, but it is not so easy at quantum scales. Where the quantum and macro worlds interact, the quantum parts seem to get dragged along (in time) with the macro object or process. If time is local, then there will always be a complex web of local times associated with parts of systems, similar to the complex web of gravitation between things. These webs may be too complex to crack.

When we measure time, it's just a convention. We pick a unit, seconds, minutes, hours and tick-off time. But time doesn't really tick off, it is not discrete but a continuum of some kind. In the macro world, there are many cycles, so we measure time on a circle. In the quantum realm there may be some cyclical changes, but they are not as ubiquitous. We likely need a different convention for measuring time in the quantum realm. What could we use? A time scale with random periods maybe.

If clocks slow down with increased gravity, does that really mean that time slows down? Is the clock a true proxy for time? I doubt it, anymore than a ruler is a true proxy for space. Although the concept of space seems much less mysterious than that of time, we still can't really measure the coastline of England.

If time is a local background created for and by processes, then it only exists "out there" because everywhere we look are processes, movement, and change. If nothing changes or moves, time ceases to have meaning.