# Time

*From the fixed past to the tangible present*

*to the undecided future, it feels as though time*

*flows inexorably on. But that is an illusion.*

*Paul Davies cited in Scientific American*

*Special Collectors Edition*

Time appears to be such an important part of our daily lives that it seems inconceivable to imagine time does not exist. It seems to 'flow' from the past to the present and on to the future. We remember the past, live in the present but we cannot know the future. But what is the position of time in science? Newton considered time to be eternal with no beginning and no end. The first real challenge to Newton's eternal, never ending view of time came from Albert Einstein in his Special Theory of Relativity. Einstein maintained that every one has his/her own time depending on the speed at which he/she travels. It is impossible to specify events that everyone can agree happen simultaneously. Events that are both "now" to me will happen at different times to anyone travelling at a different speed. Events that are both 'now' to me will happen at different times for someone else moving at another speed. We are all familiar to satellites orbiting the Earth having different times to persons on Earth. In physics the *now* is a delusion.

The result of this picture of time is the so called ‘block’ universe. This means you see yourself as standing ‘outside’ the universe. There is nothing that distinguishes this place (block) from any other. There is no uniquely defined present. Other observers moving at different speed will experience different nows. The renowned cosmologist, Professor George Ellis, Professor emeritus at the University of Cape Town disagrees with this. (Prof. Ellis quoted in Popular Mechanics, January 2014). “The block universe contradicts every single experience we have”. This view of time is that the flow of time is an everyday experience. A hypothesis is made tested and accepted or rejected.

The block view and even the rejection of the existence of time is completely the opposite in **quantum mechanics. The most notorious example of time** in quantum mechanics is the Schrödinger’s cat. The cat is locked in a box with a vial of poison of which the seal may be intact or it may not be intact. You won’t know if the cat is alive or dead until you remove the seal when the cat’s status will be definitely revealed. Not with standing this example of the quantum indeterminacies can only occur at the level of the very small.

How to solve the conundrum of time, does it exist or not? Some scientists like Lee Smolin believe that the answer may be found in the ‘rescuing’ of time. His point of departure is the complete reformulation of general relativity. Smolin’s point of departure is a reformulation of general relativity

developed by Julian Barbour and others. The result of this, if proved to be the solution, will mean that a clock in quantum mechanics will distinguish one moment from another. This means the resurrection of time. The greatest achievement, if true, will be the unification of general relativity with quantum mechanics and an understanding of gravity at the levels of the small and large. Other scientists, however, disagree with this solution. Who is right? Only time will tell.

Frikkie de Bruyn