

Cosmological model by cosmological principle

— 5 Time, space and dimension of cosmos —

We know already that there are time and space in cosmos. Cosmos consists of time and space. According to cosmological principle, cosmos is, on the large scale, homogeneous and isotropic. In other words, time is homogeneous and isotropic, and, space is homogeneous and isotropic, too. We can say simply “Cosmoses are the same”. Time and space are essential, fundamental components of cosmos, although they have entirely different nature. We can never escape from time and space. We can no longer analyze time and space themselves. Time flows every moment. Time and space have position. To present a position in cosmos, we have to set up origins and graduations of time and space, respectively. These origins and graduations cannot be absolute but relative, because cosmos is the same. Thus, dimensions of cosmos are established artificially. Roughly speaking, beginning of century may be one of selections as origin of time. Graduations of time can be obtained from clock that is familiar to us.

The origin of space is to be the earth. Graduations of space are to be shown by 3-dimensional coordinates. Distance between two positions in space is measured by time in which light runs. Thus, we can recognize a position by one dimension of time and 3 dimensions of space, that is, by 4 dimensions. Cosmos is 4-dimensional world. Origins and graduations are artificial, not provided naturally by cosmos. The earth as the origin of space is moving in cosmos, but the earth is always center of cosmos and keeping relativity.

Birth of cosmos is, in other words, birth of time and space. Birth of cosmos happens in finite past. This happening is local matter in the parent cosmos. We describe about time as follows.

Time of new cosmos succeeds time of its parent cosmos. Time of parent cosmos begins with its birth, succeeding time of its parent cosmos, that is, “parent cosmos of parent cosmos”. Time of “parent cosmos of parent cosmos” begins with its birth, succeeding time of its parent cosmos, that is, “parent cosmos of parent cosmos of parent cosmos”. Thus, beginning of time goes back throughout past generations of cosmos. Therefore, the earliest beginning of time is infinitely distant past. This infinity is open and time has no wall. There is no concept of “before the earliest beginning of time”.

Time continues to flow toward future. If a cosmos dies, time of the cosmos ends but time of parent cosmos remains. If parent cosmos dies, its time ends also and time of “parent cosmos of parent cosmos” remains. Thus, the time of “last end” is of infinitely distant future. The infinity is open and it has no wall. There is no concept of “after the last end”. From cosmological principle, we can say that time has no wall in the most distant past and in the most distant future. The flow of time continues constantly

and eternally.

Time and space are inseparable from each other. They have neither advantage nor disadvantage. There is no rank of high or low. We can neither discuss time without space nor do space without time. Their births happen at the same time. Their deaths also happen at the same time.

We cannot see time itself. However, we can feel flow of time and apply it to our behavior . This depends on function of our brain. We can remember and record time, and go back to past. Though these facts are related to time, but not time itself. We can certainly say that we are in the flow of time itself.

We can obtain information of time by means of light. Seeing photograph of distant domain of space, we know there are many stars (galaxies). Times of stars which were taken in photograph at a time are seen not equal because of different distances from the earth. Because of information that was carried by light, more distant stars record more distant past. If we observe moving stars, we will have information of different times passing with different velocities.

Time is the same all over cosmos. We cannot change this flow. Time that we make use of and operate, is like copy of time that flows constantly in cosmos. Everybody knows calendar, standard time, etc,. After clock was invented, people's mutual understanding about time was promoted. To make clock fast or slow, or to go back to past is realized by machine which we made. To make it possible is the constant flow of time in cosmos.