

Cosmological model by cosmological principle — 2 Scope and structure of cosmos —

Cosmological principle is valid all over cosmos. According to the principle, size of cosmos is infinite. Definition of infinity depends on mathematics. Cosmos has wall and shuts light in. According to prevailing cosmology, it is said that our cosmos has something like wall, too (Fig.2 – D). Since cosmos has wall, there must be space outside of wall. How is the outside of cosmos? We have no means to observe it. We cannot tell about it except by inference. Better inference should be simple and reasonable.

All spaces and their contents belong to cosmos. It includes objects that we cannot observe. Consequently, cosmos should consist of our cosmos and space outside of wall.

Since our cosmos is surrounded by space outside of wall, so that we call the space “parent cosmos”. Since cosmological principle is valid all over cosmos, it must be valid in parent cosmos, too. Therefore the size of parent cosmos is infinite and it has wall, too. And we can recognize two cosmoses, that is, our cosmos and its parent cosmos. Thus, concept of cosmos is enlarged.

Light in parent cosmos takes infinitely long time to arrive at its infinitely distant wall. However, the light arrives at our cosmos in finite time. We can say that **our cosmos is a celestial body in parent cosmos**. Our cosmos is to be called “offspring” of parent cosmos. **The size of our cosmos is finite, if measured in parent cosmos**. To see parent cosmos from our cosmos will be of the same situation as we see our space from the earth.

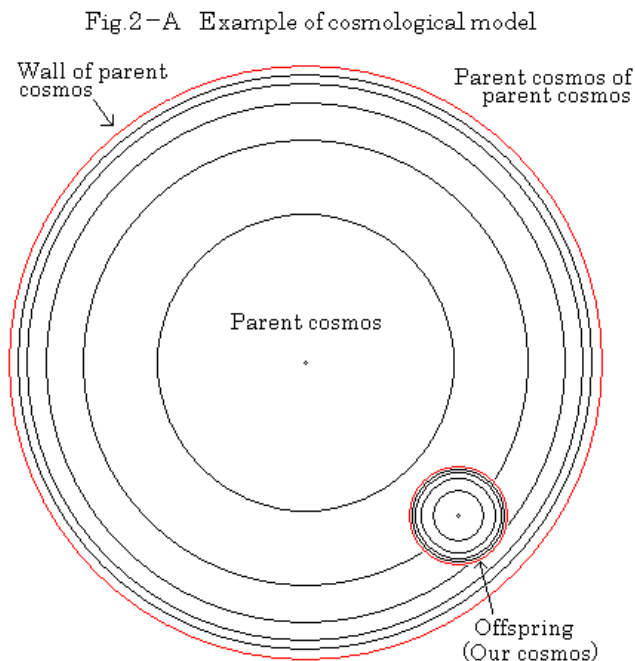


Fig.2 – A shows a section of parent cosmos cut by a plane. Large circles of a common center show parent cosmos whose largest circle (red) is its wall. Small circles of another common center show our cosmos whose red circle is its wall. Outside of parent cosmos is “parent cosmos of parent cosmos”.

Relation between parent cosmos and “parent cosmos of parent cosmos” is the same as relation between our cosmos and parent cosmos. “Parent cosmos of parent cosmos” has its wall, too. Generally speaking from cosmological principle, each cosmos has its wall to close the cosmos.

Thus, we can go back to past generations of cosmos. However, there is no earliest wall. There is no wall that closes all of walls. Number of walls is open infinity.

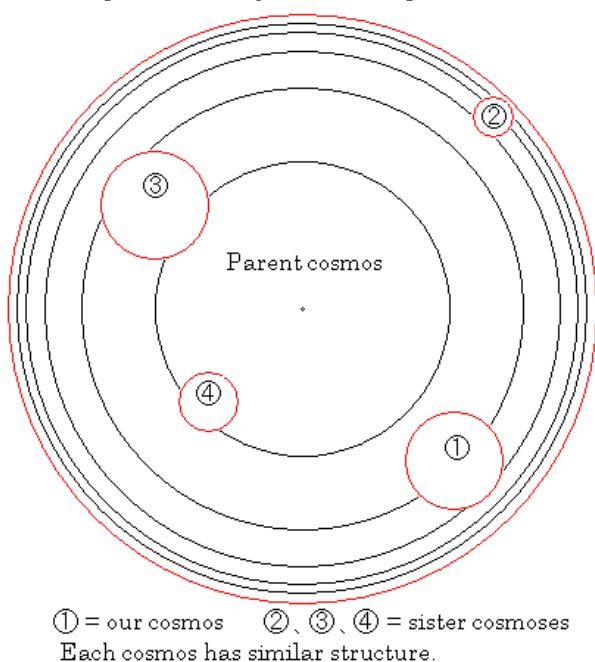
There is no concept of distance from the earth to inside of parent cosmos, because light

cannot go through wall of our cosmos. Generally, there is no concept of distance between different cosmoses also, if light cannot go through different cosmoses.

If cosmoses are celestial bodies in a parent cosmos, distances between them are measured in the parent cosmos.

According to cosmological principle, cosmos is, everywhere, on the large scale, homogeneous. Therefore, any scenery in parent cosmos will be similar to ours. And we can say that **the size of parent cosmos is equal to ours in the same level of infinity**. Thus,

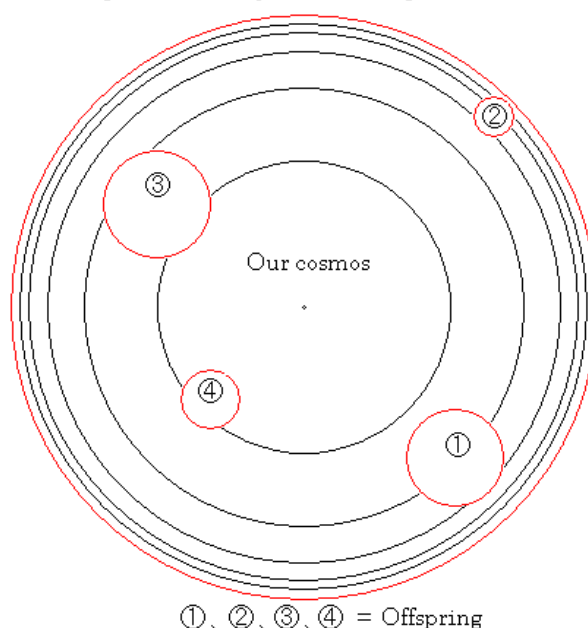
Fig.2-B Example of cosmological model



According to cosmological principle, there is no special place in cosmos. Though our cosmos is a celestial body in parent cosmos, it should not be special existence in parent cosmos. Hence, there may be cosmoses like our cosmos, that is, our sister cosmoses. Number of sister cosmoses has no limit. Fig.2-B shows the state. Let ① be our cosmos, then ②,③ and ④ are to be our sister cosmoses. Circles of common centers are omitted. Sizes of sister cosmoses measured in parent cosmos are finite and not necessary to be equal. However, each size is equally infinite in its inner measure, respectively.

cosmos has two measures, that is, inner measure and outer one. Measure of distance depends on time in which light runs. But light cannot run through wall. Inner distance depends on inner light and outer distance depends on outer light. This is the reason why cosmos has two standards of measure. (Attention: Infinity defined in mathematics has ranks like size, but infinity is not a number, but a kind of status or property of number. Infinity of parent cosmos and that of our cosmos are of the same level. If not so, it will be inconsistent with cosmological principle. It is right that infinite part of cosmos is equal to whole cosmos from the point of view of size.)

Fig.2-C Example of cosmological model

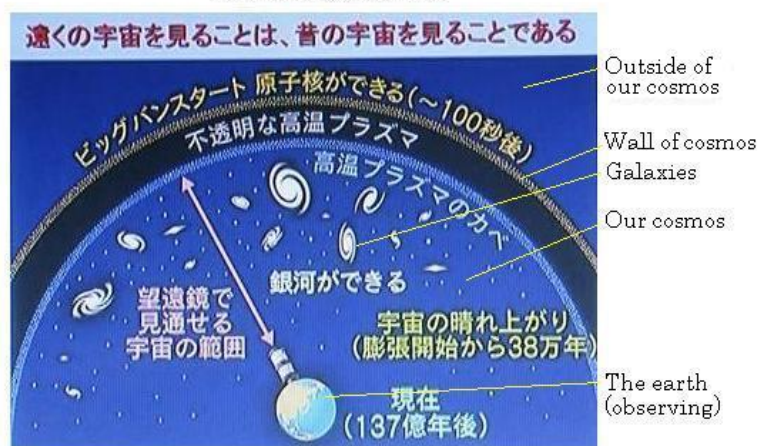


According to cosmological principle, cosmoses are similar to each other, so that “parent cosmos” can be replaced by “our cosmos”. Then our cosmos is to have offspring. In Fig.2 –C, ①, ②, ③ and ④ are to be read as offspring of our cosmos. Circles of common centers of offspring are omitted.

Summarizing;

- (1). Cosmos has two measures. One is inner measure and another is outer measure. The reason why cosmos has two measures is that cosmos has wall where light cannot go through.
- (2). Sizes of cosmoses are equally infinite by their inner measures, respectively.
- (3). Sizes of our cosmos and sister cosmoses are finite, if measured in parent cosmos. They are celestial bodies in parent cosmos.
- (4). Every cosmos has parent cosmos and offspring. Cosmos as a whole consists of numberless different spaces. Structure of cosmos is like nest or fractal.
- (5). Number of walls of cosmos as a whole is infinite. The infinity is open. There is no concept of “the earliest wall”.
- (6). There is no concept of distance between different cosmoses, if light cannot go through different cosmoses.
- (7). What we can observe is only part of our cosmos. We know celestial bodies which do not let light out have been found in our cosmos. From cosmological principle, these celestial bodies are not special existence.

Fig.2-D An example of education on cosmology in Japan



Source 放送大学「宇宙を読み解く」(09)第13回より。

On this occasion, we will introduce an example of education of cosmology in Japan.

Fig.2 –D shows about our cosmos. A wall is seen. Outside of our cosmos is seen, too. But no explanation is given about outside of our cosmos.

(Letters of the right side are author’s description.)