

Cosmological model by cosmological principle

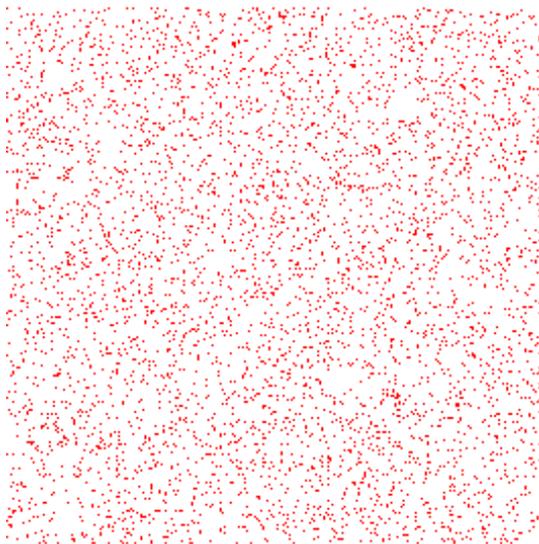
— 6 Cosmos and probability —

According to cosmological principle, cosmos is, on the large scale, homogeneous and isotropic. There are various types of objects with great variety of shapes and colors. Some of them disappear sometimes and new objects appear sometimes. Their births and deaths are happening often. What controls them? They are, on the large scale, controlled by probability. Probability will not work as major factor on the small scale, where regularity will work as major factor. In cosmos, these two factors work always together.

Probability makes events happen at random. Frequency that events occur makes a randomized distribution. **Probability in which an event occurs in cosmos should be equal all over the cosmos, because cosmological principle says “homogeneous”.** What is the numerical value of probability? The answer is “infinitesimal”. It is a well known misunderstanding that, if probability is equal at every position, events occur at each position regularly. It is wrong to think that events occur with rule. **Statistically speaking, probability produces variance(variation).** As the evidence, cosmos is full of various objects with shapes and colors.

We can show a simple example of stochastic event. Suppose we expose a chessboard for a short time in the rain. The probability that a raindrop falls in a square is equal. We count number of raindrops in each square. The number may be 1, 3, 0, 2,..... It will be very rare that the numbers are 2, 2, 2, 2,... This example implies that it is valid in cosmos. Fig.6– A shows dots as an example of distribution of random numbers. Dots are scattered irregularly. They can be read as galaxies in cosmos. Carefully seeing, they are

Fig.6– A Distribution of random numbers



densely gathered in some areas and forming clusters. On the other hand, they are scarce in other areas. There is no regularity in distribution of clusters. Moreover, we can find area where clusters look like forming a cluster (cluster of clusters). These are compared with group of galaxies. There will be higher level of clusters.

Fig.6-B Distribution of regulated dots

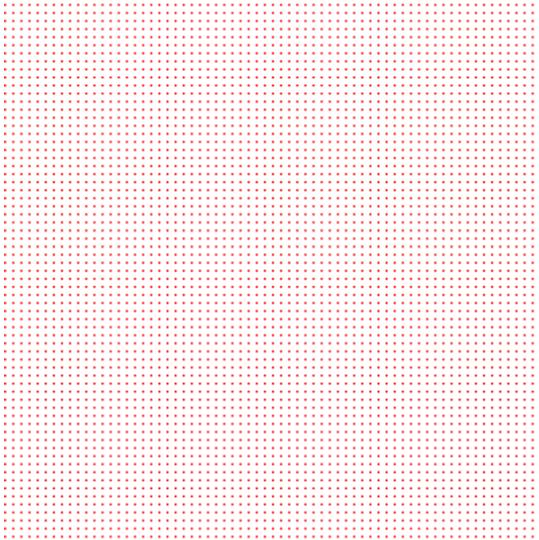


Fig.6-B is shown for reference. Dots are arranged regularly. There is no cluster of dots.

Celestial bodies are moving like floating in cosmos. They are gathering or separating at times, keeping balance of gravity. They meet accidents of collision etc.,. Accidents will occur by probability and balance of gravity will be affected.

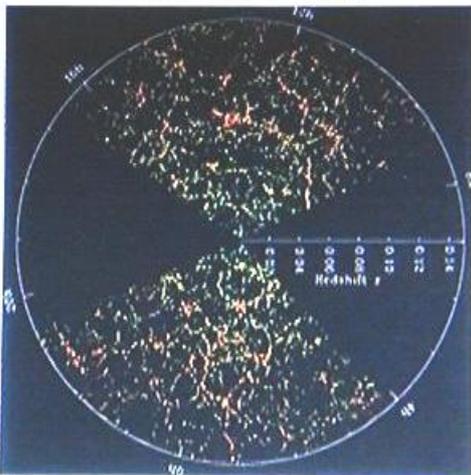
Seeing stars in the sky, they look as if they were fixed. It comes from our sense about time. If time went by fast, they would move quickly. Distribution which is caused by probability changes as time goes by. Density of celestial bodies changes from high (low) to low (high), too.

Fig.6-C reminds distribution of random numbers shown in Fig.6-A.

Fig.6-D shows a temporary distribution of cosmic background radiation. The pattern will change as time passes. The pattern looks like stochastic phenomena seen in Fig.6-A. This may be effect of Big Change.

Fig.6-C Distribution of galaxies as far as about 1.5 billion light years

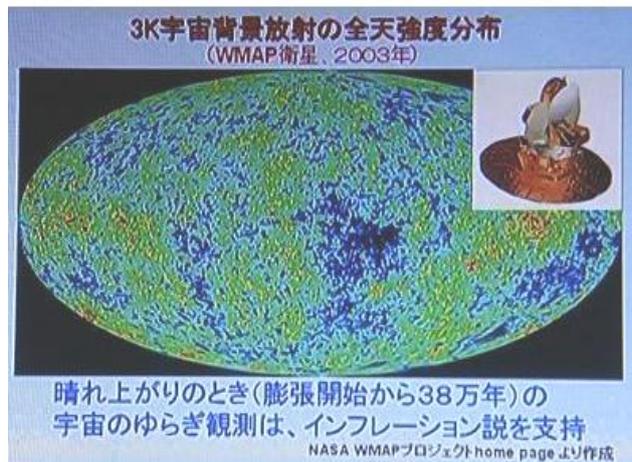
約15億光年までの銀河の分布 (SDSSプロジェクト)



画像提供 M. Olanton and the Sloan Digital Sky Survey (HP)
(M.Olanton and the Sloan Digital Sky Survey (HP))

Source: 放送大学「宇宙を読み解く」(09) 第13回より。

Fig.6-D Distribution of cosmic background radiation



Source: 放送大学「宇宙を読み解く」(09) 第13回より。