

Studies on Planetary Radiation in the fields from Jovian Plasma Environment and further towards the Plasma Universe

Hiroshi Oya[1]

[1] Space Communication Engineering, Fukui Univ. of Tech.

1.Importance of planetary Radiations

From the standpoint of the planetary radio waves, the discovery and followed studies of the auroral kilometric radiations (AKR) had opened a new concept for the studies of radio waves from the entire universe. Before having knowledge of AKR, physicists in this field of planetary radio waves had tendency to overlook the coherent processes, only considering about cyclotron or synchrotron mechanisms of single particle. Planetary radiation with burst feature are, however, verified to be the results of coherent processes caused by incoming electron beams being coupled with the plasma environment.

Based on the established physics of the coherent radiations in space plasma, the Jovian decameter wave radiations are grasped by the new concept; that is, the energy sources are understood to be brought as the form of Jovian Aurora that is typical states of the non-equilibrium physics. In the midst of 1970's, Activity of in-situ observations of the Jovian plasma environment started mostly by efforts of NASA. The activity had opened new era of studies of Jovian magnetosphere. Jovian magnetosphere is not only scaling up of the earth's magnetosphere but that contains different category of physics; i.e. rotating effect of the magnetized plasma because of its intense magnetic field and high rotation period. Therefore, we can find important essence of the physics of pulsar plasma.

2.From Jupiter to Pulsars and Black Holes

Investigation of Jovian plasma processes is therefore significant clue to understand the pulsar; the extension of the studies in this direction guide us further to the final goal of the Study on rotating black holes. Black holes plasma is extreme case of non-equilibrium physics; plasmas are currently absorbed by the black holes spiraling towards the rotating center. New approach of the investigation, of the Kerr time space, which leads to the studies in the experimental verification of general relativity was started by observation of decameter radio wave pulses from the Galactic center (1); the sources are identified to be multiple of super massive rotating black holes. Observation of the radiation from the rotating black holes has already been made since the end of 20th century and now going to be expended to the near galaxy. Andromeda nebula. However, the activity has not been followed and recognized in the field of Astrophysics at the present.

3.Importance of Low Frequency Astrophysics and Moon Base Observations

We recommend here future studies on new exploration of the galaxy center by decameter radio waves. Because of unfortunate situation surrounding the observation environment of the decameter waves on the earth, development of the low frequency observation stations on the moon surface are essential for developments of low frequency Astronomy. By that is becomes possible to challenge to the limit of the general relativity by investigating the singularity of the Kerr time space, i.e. so called the event horizon which is equivalent to the black hole surface. We may find there multiple of black holes in all centers of galaxies in the universe; though the concept is not believed in the present field of Astronomy.

(1)Oya, H. and M. Iizima, Tohoku Geophysical Journal, Ser.5 Vol 35,1-78, 1999