Reduction of Mass of Groups of BH's from Decameter Radio Wave Pulses from M31, M33 and Our Galaxy

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From the observed data of decameter radio pulses by using long baseline interferometer, it is concluded that there are groups of super-massive black holes in the center part of galaxies in the local group of galaxy such as M31, M33, and our Galaxy. The conclusion which completely differs from the current idea of single super massive black hole in the center part of galaxies is based on the assumption that each pulse source of pulse groups corresponds to a rotating black hole. The pulse period is, therefore, coincides with the rotation period of the Kerr black hole. After publication of this conclusion there remains two significant subjects; i.e., 1) how we can determine the source position with accuracy of 1 arc second by using 100km range long base line interferometer for the decameter radio waves, and 2) how we can determine the mass to pulse period ratio.

For the subject 1), we have already clarified by observing two different objects applying the same observation system with same data analyses method; i.e., mapping the Cassiopeia A radio source and detection of the pulsar PSR0329+54 that shows the pulse period of 0.7145sec.

The present work is purposed to study the subject 2). From simple assumption of the source location of radio wave pulses at the static limit of the Kerr black hole which indicates rotating velocity coinciding with the light velocity, the mass M normalized by the solar mass is expressed by

$$M \sim 10^4 T$$

for the period T sec. In actual case, the above assumption could be over simplified; we should know source position and rotating speed of the Kerr black hole. By introducing correction factor K, then, the mass to the pulse period is expressed by

$$M = 10^4 T / K.$$

In the present method the total masses M_T of the center part of galaxies are expressed by

$$M_T = (sum_{I=1}^N 10^4 T_i) / K .$$

By adding data of M33 nebula which has been achieved recently, it is clarified that K=1.9, 1.5~2.2, and 2.2 respectively for the cases of our Galaxy, M31 nebula, and M33 nebula. This coincidence of range of K value around 2 gives significant conclusion that the hypothesis of the group of Kerr black holes in the center part of local group galaxies is supported by the existence of a common underlying physics. That is, the K value may become a significant clue to understand the physical processes around the Kerr black holes in future works.