

## Determining the parameters of binary supermassive black holes

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A model is proposed for finding the parameters of close binary systems of supermassive black holes based only on observational data in the radio range. The methodology for determining the physical characteristics of the binary systems of supermassive black holes includes conducting harmonic and wavelet analyses, determining the masses of the satellites and their orbital characteristics. It is shown that 3C 273, 3C 454.3, OJ 287, AO 0235+164 and S 0528+134 can be a very massive and close binary system, containing companions with similar masses [1-3].

The main physical characteristics of binary supermassive black holes (SMBHs) located in the central regions of the system are obtained. These data were used to find the masses of the SMBH companions, the parameters of their orbits, the energy reserve of the system, and the lifetime of the object before the SMBHs merger.

The level of gravitational waves on the Earth's surface was determined and the possibility of their detection by International Pulsar Timing Array (IPTA) gravitational wave detectors was considered. Blazar S 0528+134 is the most powerful emitter in the universe, including the range of gravitational waves.

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