

Post-Newtonian approximation for a wormhole binary system

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We consider a binary system consisting of two traversable wormholes as one of the gravitational wave source candidates. If the two wormholes are far enough apart from each other, they can be treated as point masses, and the properties of gravitational waves generated by the system is very similar to those of a binary compact star system. However, when they approach each other and the system is at the late inspiral state, the finite-size effect becomes very important. When the Post-Newtonian approximation is applied to the wormhole binary system, we have to adopt the effective mass definition from gravitational potential of the wormhole. If the wormhole matters are distributed in delta-function type, wormhole can be considered as the point mass with the effective mass. If matters are distributed differently, such as the power-law, the finite-size effect can be seen using the effective one-body method.

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