

Graviton mass evaluation with trajectories of bright stars at the Galactic Center

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In the papers reporting about this discovery, the joint LIGO \& VIRGO team presented an upper limit on graviton mass such as $m_g < 1.2 \times 10^{-22} \text{eV}$ \cite{Abbott_16,ligo16}. The authors concluded that their observational data do not show violations of classical general relativity because the graviton mass limit is very small. We show that an analysis of bright star trajectories could bound graviton mass with a comparable accuracy with accuracies reached with gravitational wave interferometers and expected with forthcoming pulsar timing observations for gravitational wave detection. This analysis gives an opportunity to treat observations of bright stars near the Galactic Center as a tool for an evaluation specific parameters of the black hole and also to obtain constraints on the fundamental gravity law such as a modifications of Newton gravity law in a weak field approximation. In that way, based on a potential reconstruction at the Galactic Center we give a bounds on a graviton mass.

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