Accreting black holes in the presence of a positive cosmological constant

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ABSTRACT: In general relativity, the cosmological constant λ is a special term in the Einstein field equations. Many observational clues suggest that λ is positive. In this thesis, we investigate the behavior of quasilocal horizon of black hole under the condition of positive λ.We modify the λ studied in the existing literature and recalculate the evolution of marginally trapped tube in Tolman-Bondi spacetime with non-vanishing λ. Then, we apply the obtained results to some examples of the gravitational collapse of spherical dust clouds to investigate the influence of positive λ on marginally trapped tube during the formation or growth of black hole. By analysis and comparison, we have found that there are significant effects of positive cosmological constant on the behavior of MTT evolutions in dust clouds collapse.

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