

Light trajectories and optical appearances in asymptotically Anti-de Sitter-Schwarzschild and black string space-times

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Abstract: In view of the progress and future expectations of Very Long Baseline Interferometry (VLBI), which has already provided the most precise and clear images of the central objects located at the center of the M87 Milky Way galaxy and which strongly point out towards their nature as the one of a Kerr black hole, an intensive research work has been carried out in the literature on analyzing and simulating light trajectories and reconstructing the corresponding optical appearance for a wide plethora of ultra-compact objects in an attempt to challenge the Kerr hypothesis. Such an image is directly affected not only by the features and physics of the accretion disk but also by the space-time structure itself, whose combination yields a characteristic fingerprint. In this paper, we consider such a fingerprint for objects which are not asymptotically flat but instead approach a Anti-de Sitter space-time. This assumption significantly influences light trajectories and, consequently, the corresponding images of the central objects as seen by a far away observer, which can be used in future VLBI observations for testing the Kerr paradigm. We illustrate our considerations with the example of a black string.



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