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Spherical orbits and shadows of Kerr black holes surrounded by quintessence

Spherical orbits around rotating black holes have a major astrophysical importance. In the presence of quintessential matter [1, 2], the geodesic equations can be investigated using a combined numerical-analytical approach [3]. One may notice significant differences compared to the results previously derived for Kerr black holes [4]. Also, as it is known, the rotating black holes produce shadows that differ significantly from those of nonrotating black hokes which are perfectly circular. By comparing the theoretically derived shadow's observables with data on M87*and Sgr A* from the Event Horizon Telescope, one may impose constraints on the black hole's parameters and highlight the impact of quintessence [5].

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