

Relativistic effects on the orbit of the closest stars to the black hole at the center of the Galaxy

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In this presentation we investigate the detection of the angular momentum (or spin) and quadrupole moment of the black hole at the center of the galaxy called Sgr A. *These parameters affect the astrometric and spectroscopic observations of stars in the close vicinity of the black hole (S stars). Here, we consider a collection of S stars as well as a*

putative star called S2/10 that is identical to S2 but 10 times closer to Sgr A, and thus much more affected by the spin effects. Such a star might exist if it is too faint to have been already detected by GRAVITY. It is possible that either future observations of this instrument, or of its update GRAVITY+ that is under development, might detect such a faint inner star. In order to reach our objectives, we use the different relativistic models in order to generate the orbit and radial velocity of the S stars and analyze how they can be affected by the spin and quadrupole moment of Sgr A. This, allows us to affirm the detectability of these quantities which will enable us to test the no-hair theorem and thus general relativity.*

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