

# 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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