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The motion of S2

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The motion of S2, one of the closest star to the Galactic Center, has been largely studied and used to set constraints on the compact object at the center of the Milky Way, which is well established to be a supermassive black hole.
However, the nature of the environment around Sgr A* is still an open issue, leaving the intriguing hypothesis that it is made of dark matter open. In this talk I will present how we can use the astrometric and spectroscopic measurements of S2 to constrain the properties of an ultralight scalar field that has clustered around Sgr A*. I will explain the theoretical model and how we performed the analysis to find the best-fit estimates for the parameters describing a toroidal- shaped scalar field cloud. Finally, I will show some preliminary results.

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