Testing the black hole no-hair theorem at the galactic center
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— Precessions of the orbital planes of stars orbiting the galactic centre black hole
depend only on the angular momentum and quadrupole moment of the central black
hole. Therefore, studying precessions of the orbital planes of several stars can pro-
vide a way to test the black hole no-hair theorem, which requires that $Q = -J^2/M$.
Such a measurement would give conclusive evidence that the galactic center object
is really a black hole [1]. We are studying other factors that might perturb these
orbits, including gravitational interaction with a population of other stars orbiting
the GCBH. Using standard orbital perturbation theory, we have calculated analyt-
ically the time averaged rates of change of all the orbit elements of the target star
caused by a given perturbing star and also, the r.m.s orbital plane precessions due
to a population of perturbing stars inside and outside the orbit of the target star.
We compare the results with those from numerical simulations [2]. Supported in
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[1] C. M. Will, Astrophys. J. Lett. 674, L25 (2008)
[2] D. Merritt et al., Phys. Rev. D 81, 062002 (2010)

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