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Dynamical models of the Milky Way nuclear star cluster

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The nuclear star cluster (NSC) of the Milky Way has been extensively studied in the last decades, using ground-based astrometry and spectroscopy of ~10000 stars in the inner 10 pc.

The Galactic centre is unique in that we have a direct measurement of the mass of the supermassive black hole (SMBH) from the motion of S-stars, which can be tracked for a significant fraction of the orbital period. However, the remaining vast majority of stars in the NSC are essentially a single kinematic snapshot, and fall within the realm of classical methods for inferring the gravitational potential from the assumption of dynamical equilibrium.

I present a new twist in this analysis based on the iterative self-consistent modelling method with action-space distribution functions. I discuss the constraints on the NSC properties and the intrinsic degeneracies and limitations of this inference procedure, which are relevant more generally for dynamical modelling of extragalactic nuclear clusters.

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