

Abstract:

Finding an intermediate-mass black hole (IMBH) in a globular cluster, or proving its absence, is a crucial ingredient in our understanding of galaxy formation and evolution. The challenge is to identify a unique signature of an IMBH that cannot be accounted for by other processes. Observational claims of IMBH detection are often based on analyses of the kinematics of stars, such as a rise in the velocity dispersion profile towards the centre of the system. However, this signature is degenerate with other scenarios. As an example of this degeneracy, we analyse the case of ω Cen by comparing the observed profiles to those calculated from radially anisotropic models and from models that account for the presence of multiple mass components segregated in the system. We show that it is possible to partially explain the innermost shape of the projected velocity dispersion profile, even though models that do not account for an IMBH do not exhibit a cusp in the centre. Our analysis cannot rule out the presence of an IMBH, but puts some caution on the amount of mass that could be accounted for by such an object.