

Title

**Intermediate mass black holes and systems of stellar black holes in the core of globular clusters**

Abstract

Intermediate mass black holes (IMBHs) are black holes (BHs) with mass above that of the BHs born from stellar evolution but below that of supermassive BHs found in the centres of galaxies. The evidence for them is limited but they are thought to inhabit the cores of globular clusters (GCs). One way to look for them is to study the acceleration felt by the pulsars in the GCs. This has led to potential detections of non-luminous mass excess in the cores of some GCs but, using only the accelerations, it is not possible to distinguish the case between one single IMBH and a population of stellar mass BHs. Starting from N-body simulations of GCs we have discovered that a detection of the successive derivatives of the acceleration can distinguish between the two cases and determine the nature of the mass excess. We want to focus on three GCs previously observed with MeerKAT and with claims of mass excess in the cores. These are M62, NGC6752 and NGC6624. Using simulated observations, we derive that, with only one observation per semester of each cluster, the derivatives of the accelerations will become measurable within 1 year for many of the pulsars and within 2 years for all. Even with the small number of pulsars close to the cores of these GCs, we show that they will be enough to determine if they contain an IMBH or a population of stellar mass BHs.