

Abstract:

## AMUSE-VIRGO: DOWN-SIZING IN BLACK HOLE ACCRETION

An issue of fundamental importance in understanding the galaxy-black hole connection is the duty cycle of accretion. If black holes are indeed ubiquitous in galactic nuclei, little is known about the frequency and intensity of their activity, the more so at the low-mass/low-luminosity end. I will present new results from AMUSE-Virgo, a Chandra survey of (formally) inactive early type galaxies in the Virgo cluster. Out of 100 objects, 32 show a nuclear X-ray source, including 6 hybrid nuclei which also host a massive nuclear cluster as visible from archival HST images. After carefully accounting for contamination from nuclear low-mass X-ray binaries based on the shape and normalization of their X-ray luminosity function, we conclude that between 24-34% of the galaxies in our sample host a X-ray active super-massive black hole. This sets a firm lower limit to the black hole occupation fraction in nearby bulges within a cluster environment. At face value, the active fraction is found to increase with host stellar mass. However, taking into account selection effects, we find that the average Eddington-scaled X-ray luminosity scales with black hole mass as  $M_{\text{BH}}^{-0.62}$ , with an intrinsic scatter of 0.46 dex. This represents the first observational evidence for 'down-sizing' of black hole accretion in local early types, that is, the fraction of active galaxies, defined as those above a fixed X-ray Eddington ratio, decreases with increasing host galaxy mass.