

# Astrophysics Seminar Speakers

## 2020-21

### Becky Smethurst (Oxford University)

#### **The growth of supermassive black holes in the absence of mergers and the effect on their host galaxies**

*21 April 2021*

The co-evolution of galaxies and their supermassive black holes (SMBHs) via mergers is a long-held paradigm that has recently been overturned. With a sample of 'bulgeless' disk-dominated galaxies Simmons, Smethurst & Lintott (2017) showed that in the absence of mergers, SMBHs can grow to  $10^9$  solar masses. A follow up study by Martin et al. (2018) found that in simulations, 65% of all the matter contained in SMBHs at  $z=0$  was acquired through non-merger processes. We now present narrow band imaging of the [OIII] 5007 Å component for 12 of these 'bulgeless' disk-dominated galaxies hosting luminous, unobscured AGN with spectrally confirmed blue shifted outflows, presumed to be powered by the AGN itself. These massive galaxies' formation histories are dominated by non-merger secular processes and thus provide a unique opportunity to study how inflows from secular processes fuel significant growth of black holes in the absence of significant mergers. We have constrained this contribution from secular processes by using the luminosity and extent of the [OIII] 5007 Å outflow in the narrow band images to measure the rate of mass loss in outflows from the central AGN of these disk-dominated galaxies. By combining these measurements with spectroscopically derived data constraining the black hole accretion rates, we have placed a limit on the total inflow rate to the centre of these galaxies. Further analysis of these systems with integral field spectroscopy techniques offers the promise of directly measuring the black hole growth that is occurring in present day systems evolving solely via secular evolution, and the impact of AGN feedback in such systems due to outflows.

### George Lansbury (ESO)

#### **A high-energy view of (obscured) cosmic supermassive black hole growth**

*13 July 2021*

A hard X-ray ( $E > 10\text{keV}$ ) census of supermassive black hole accretion across cosmic time is becoming possible. While the Swift-BAT/INTEGRAL telescopes have provided a crucial benchmark in the local Universe ( $z < 0.05$ ), more recent surveys with the NuSTAR mission (e.g., the  $> 1000$ -source serendipitous survey) now sample the hard X-ray population to much higher sensitivities, with a focus at  $z \sim 0.5-1$ . This talk will give a summary of the hard X-ray survey census, and how analysis of extreme "hidden" subpopulations of AGN is giving insight into the extent of accretion occurring beneath dense (Compton-thick) gas in the circumnuclear environment. The talk will also show how high-energy observations of the multiwavelength-selected obscured black hole population are giving a clearer view of aspects of the interaction between black hole and host galaxy