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PhD Project Advertisement (2027-entry)

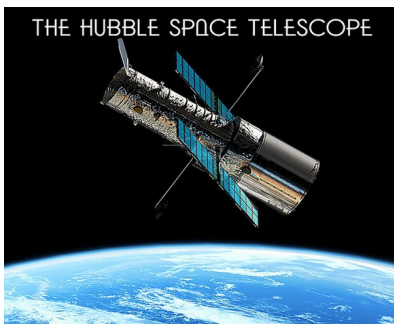
Understanding the Relation between Supermassive Black Holes and Their Host Galaxies with Multi-Wavelength Spectroscopy

URSS student also
wanted for a similar
research topic!

Project Overview

Supermassive black holes (SMBHs) residing at the centers of massive galaxies play a fundamental role in shaping galactic evolution. Through powerful accretion-driven winds and outflows, active galactic nuclei (AGN), like in the image on the right, inject massive amounts of energy and momentum into their host galaxies, regulating star formation and establishing observed scaling relations such as the $M-\sigma$ correlation.

However, understanding the complete lifecycle of these outflows requires bridging extreme micro-scale nuclear physics with macro-scale host galaxy properties. This PhD project offers an exciting, cutting-edge opportunity to investigate AGN feedback by combining data from flagship space and ground-based observatories.



What You Will Do

The successful candidate will conduct a comprehensive multi-wavelength investigation of nearby Seyfert galaxies, analysing high-resolution datasets to map how black holes interact with their environments:

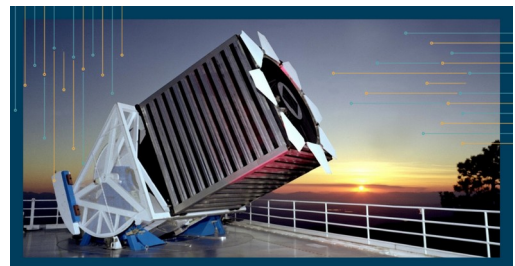
High-Resolution X-Ray Spectroscopy: Analyse high-resolution calorimeter data from **XRISM** (X-Ray Imaging and Spectroscopy Mission) to resolve complex inner winds from black hole discs.

Ultraviolet Diagnostics: Use space-based ultraviolet spectra from the **Hubble Space Telescope (HST)** to probe intermediate-ionisation gas layers and trace nuclear column densities.

Optical Spectral Decomposition: Process and fit optical spectra from the **Sloan Digital Sky Survey (SDSS)** using advanced spectral decomposition software with Python to extract host galaxy properties.

Candidate Requirements

1. This PhD project requires you to apply for scholarship separately.
2. Strong Python programming skills.
3. Enthusiasm for multi-wavelength observational astronomy and high-energy astrophysics.



Collaboration, Mentorship, and Research Environment

You will be part of a supportive, global research community that prioritises both scientific excellence and career growth:

1. Work directly with leading collaborators across the UK, Italy, Canada, and the US.
2. Engage in weekly journal clubs and group meetings to stay on top of new papers, learn from peers, and broaden your expertise.
3. Receive tailored technical training and dedicated academic career guidance to prepare you for your next steps in research.
4. Astrophysics at Warwick actively promotes EDI through Equitea, a regular forum for discussing diversity and equity in academia.
5. Get involved in science communication through our mobile planetarium, observatory open nights, and public engagement events.