

Seeing to the Black Hole Event Horizon in AGN with X-ray Observations

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Active galactic nuclei (AGN) are some of the most luminous objects we see in the Universe, powered by the accretion of matter onto a supermassive black hole in the centre of a galaxy. Many of the physical processes by which vast amounts of energy are released and injected into the surroundings, however, remain a mystery.

X-rays are emitted from a 'corona' of energetic particles surrounding the black hole and as well as being observed directly, they are seen to be reflected from the disc of material spiralling into the black hole. The reflected X-rays are bent and shifted in energy by the strong gravitational field in the proximity of the black hole.

I will discuss how detailed measurement of the reflected X-rays using the large X-ray observatories, XMM-Newton and Suzaku, can be used to probe the innermost regions of accretion flow and corona, right down to the innermost stable orbit and the event horizon.

By connecting these observations to theoretical predictions and computer simulations, we are able to build up a three dimensional image of the extreme environment around the black hole and understand how such extreme objects are powered and how they shape Universe.