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Understanding black hole accretion flows from nearby stellar binaries to quasars at cosmic dawn

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AGN spectral energy distributions (SED) are often described by a standard template, but broadband multiwavelength data clearly show a systematic change, with the bolometric luminosity being increasingly dominated by an EUV component at higher L/LEdd while the X-ray spectra become steeper. I will discuss models of the accretion flow which can follow this behaviour, and draw comparisons to the accretion flow in stellar mass black hole binary systems, where there is a dramatic transition below 0.01LEdd from optically thick, thermal emission to optically thin, hot plasma dominated spectra, most likely due to a transition between a disc and advection dominated accretion flow. Supermassive counterparts of these transitions are seen directly in a few rare examples of 'changing look' AGN, but this is difficult to explore in the wider population due difficulties in constraining a low luminosity nucleus against twin uncertainties from host galaxy and reddening. We use a combination of the eFEDS eROSITA X-ray survey to identify unobscured (and hence unreddened) AGN from their X-ray emission, matched to excellent optical imaging from Subaru's Hyper Suprime-Cam (allowing the subtraction of the host galaxy contamination) to show that this transition is generic. This collapse of the EUV component below 0.01LEdd leads to strong suppression of the broad line region (intrinsic Seyfert 2), with implications for how we identify and select AGN across cosmic time. The changing SED also has implications for the integrated AGN emission in the Cosmic X-ray background and their predicted contribution to reionisation.

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